

ondarily will be found under the diseases causing them. A simple icterus, caused by disturbance through the innervation of the liver and bile ducts directly, can be relieved readily by thorough treatment of the liver and bile ducts as described under catarrhal jaundice. Carefully raise the intestines if they are prolapsed, especially the colon and duodenum.

Cirrhosis of the Liver

This is a chronic disease of the liver, characterized by hyperplasia of the connective tissue with destruction of the liver cells, resulting in the organ becoming hard and usually small.

Etiology.—The disease usually occurs in the male sex and in middle life. When occurring in children, it is commonly of the syphilitic form, though it may be due to other infections. The abuse of spirituous liquors is a common cause. It follows chronic diseases, such as syphilis, long continued malarial intoxication, gout and tuberculosis. Passive congestion, due to chronic heart and lung disease, causes some cases. A few cases are caused by inflammation of the bile ducts, due to infection and obstructing calculi; others to a stimulating diet, while some cases are inexplicable.

Pathologically, the **first stage** is hyperplasia of the connective tissue and consequent enlargement of the organ. As this increases the connective tissue destroys immense numbers of the hepatic cells, owing to the pressure. Often the enlargement is accompanied by tenderness. In the **later stage** the overgrowth of imperfectly developed tissue seems to contract the hepatic cells that still remain, causing atrophy and degeneration of most of them, and thus reducing the size of the organ, which is followed by sclerosis. The portal and hepatic circulations are greatly obstructed. An occasional form is termed **hypertrophic sclerosis** in which sclerosis is found while the organ continues enlarged.

There are two common and well defined varieties, atrophic cirrhosis and hypertrophic cirrhosis; other forms (rare) are met with.

Atrophic cirrhosis is the common form, and is usually due to alcoholic excess. The surface of the liver is rough and uneven in addition to its hardness and reduction in size. It may also be greatly deformed and covered with granulations ("hob-nails"). The normal weight is four or five pounds, but it may be so reduced as to weigh no more than one pound or a pound and one-half. Sometimes there is **fatty infiltration**, which enlarges the liver to such an extent that the contraction is not noticed. There is an overgrowth of the connective tissue, which contracts and constricts the branches of the portal vein, causes atrophy

and degeneration of the hepatic cells, and even sometimes obliterates the bile ducts. The new connective tissue is well supplied with blood-vessels from the hepatic artery, thus aiding greatly in the growth.

In the **hypertrophic form**, as well as in the atrophic cirrhosis, there is an overgrowth of connective tissue, but in the hypertrophic form the new form of tissue exhibits no disposition to contract. The enlargement of the organ is largely due to hyperemia. As the tissue does not contract there is no pressure on the portal vein and atrophy is prevented. There is early jaundice (which is a characteristic symptom) owing to obstruction of the biliary channels. The surface is smooth and its color is greenish yellow.

Symptoms.—Atrophic Form.—There may be practically no symptoms. As there is obstruction of the portal circulation, there may be congestion of the stomach and intestines, resulting in chronic gastric or intestinal catarrh having the following symptoms—anorexia, distress after eating, distention, constipation and coated tongue. Owing to the anastomotic communication between the portal and caval circulations, as the portal circulation becomes more obstructed, the superficial abdominal veins become greatly distended. Hemorrhoids occur, owing to the communication of the superior hemorrhoidal, which is a branch of the portal vein through the inferior middle hemorrhoids, with the hypogastric vein and the vena cava; hence hemorrhoids are a characteristic symptom. There is enlargement of the spleen and hemorrhage from the stomach or bowels. Edema of the legs and ascites are due to engorgement of the portal system. Ascites is much more common than edema of the legs. There may be slight jaundice, although this is a rare symptom in atrophic cirrhosis. There is always decided emaciation. On examination there is a diminished area of hepatic dullness, while the splenic dullness is enlarged. It is often impossible to outline these organs, as the abdominal distention prevents it. The urine is scanty, high-colored and often loaded with urates, but seldom bile-stained.

In the **hypertrophic form** slight jaundice appears at the onset, which gradually deepens until it is intense and persistent. Occasionally there is fever. The disease as a rule is decidedly chronic, though acute symptoms may develop at any period. The urine is often bile-stained, but of normal quantity. On examination the liver is large, smooth and round and can be felt below the ribs. The spleen is greatly enlarged.

Diagnosis.—In **atropic cirrhosis**.—With ascites without dropsy

elsewhere, history of alcoholism, hemorrhage from stomach or bowels and reduction in size of liver, the diagnosis is absolute.

Hypertrophic cirrhosis.—In **cancer** of the liver the patient is advanced in years, has no splenic enlargement, and more commonly ascites is present; while in hypertrophic cirrhosis there is chronic biliary obstruction, the liver is only moderately enlarged and hard, marked jaundice, with causes leading to or evidence of hepatic obstruction. This form of cirrhosis is also to be differentiated from **amyloid liver** and **echinococcus cyst**.

Prognosis.—Unfavorable, although in some cases the disease can be arrested during the early stage, provided the habits are regulated and treatment is continuous and persistent. Death usually occurs from one to two years after appearance of dropsy. Ascites is difficult to contend with.

Treatment.—If the disease is recognized at the beginning and persistent treatment given to the liver, the chances are that atrophy of the cells and connective tissue formation will not take place. But ordinarily cases of cirrhosis are incurable. The most that can be done is to reestablish a compensatory circulation in the liver. Otherwise it would be no more unreasonable to say that one could cure a chronic valvular lesion of the heart. The patient should live a quiet out-door life. Alcoholic drinking should be stopped. The diet should be light and nutritious, preferably a milk diet. The bowels should be kept open, the skin active and the kidneys closely watched.

Fatty Liver

In fatty infiltration there is no loss of function. The fat infiltrates the cell, crowding aside the protoplasm. This is largely a normal process, though fatty degeneration may be associated.

In fatty degeneration the cell loses its structure and is changed into fatty tissue. Chronic intoxication from infectious diseases, such as phthisis puerperal fever, typhoid fever, pneumonia and syphilis are the principal causes. Alcoholism and phosphorous poisoning are other causes.

Amyloid Liver

There is infiltration into the tissues of the liver, of the so-called amyloid substance. The infiltration begins in the blood-vessels, the hepatic artery first, then the central zone or periphery, and finally all structures of the liver. This disorder should be viewed as a disturbance of metabolism.

Etiology and Pathology.—This condition is usually found in cases of prolonged suppuration, especially associated with tubercular disease of the bones as in hip-disease, syphilis, rickets, malaria, cancer and leukemia. It is believed by some to be the result of microbic invasion, especially the tubercle bacillus and staphylococcus. Lesions are frequently found from the fifth to the tenth dorsal vertebrae, which probably act as predisposing factors.

The liver is considerably enlarged and rounded. It is pale or waxy in appearance and is doughy in consistency. On section it is anemic and whitish, partly due to infiltration into the walls of the blood-vessels narrowing the lumen. The amyloid changes may be circumscribed and in some cases fatty infiltration is present.

Symptoms.—There are no characteristic symptoms except the enlargement of the liver, although the complexion may be waxy and there may be some gastro-intestinal disturbances. Pain is absent, although occasionally there is a dragging sensation, due to the weight of the organ. Jaundice is not present, but the stools may become light colored, owing to a diminished secretion of bile. The urine may be increased in amount and contain some albumin if amyloid occur in the kidneys. Emaciation and anemia are present and ascites seldom occurs. Amyloid changes involve the spleen, kidneys, intestines and other organs.

Diagnosis.—The organ being large, hard and smooth, with absence of jaundice and ascites, the presence of albuminuria and an enlarged spleen and with the history of the case, mistakes are not likely to be made.

Prognosis.—Depends upon the cause. The progress may be rapid or slow.

Treatment.—Careful attention to the primary disturbing factor and direct treatment to the liver will, in some instances, reduce the size of the organ. Nitrogenous food and hygienic measures should be instituted. The vasomotor nerves of the portal system (fifth to last dorsal) should be treated thoroughly.

Gall-Stones

Gall-stones are concretions that originate in the gall-bladder and occasionally in the hepatic ducts. "The primary formation of gall-stones is itself largely dependent upon **stagnation** of bile, such as may arise in the gall-bladder if an intermittent or incomplete closure of the cystic duct be brought about by such things as tight lacing, pregnancy, or even unequal sagging of the abdominal viscera."—MacCallum. The stone is largely composed of cholesterin, and may form without any

inflammation of the gall-bladder, owing probably to the stagnation affecting the bile salts so that the cholesterin is precipitated instead of being held in solution.

More often there is inflammation of the wall of the gall-bladder due to microorganisms. This causes an exudate from which is derived the calcium. The calcium with bilirubin is deposited in layers on the stone which give it the various colors of yellow, brown or green.

A rare type is one formed in the hepatic ducts, which is soft, green, and composed of calcium bilirubin concretions.

The stones "contain a great deal of organic material derived from desquamated epithelial cells and coagulated albuminous matter, as well as pigment." The colon bacilli, staphylococci, streptococci, typhoid bacilli, and pneumococci are the bacteria most frequently found. A **cholecystitis** may be a predisposing factor or it may be secondary to the concretion.

Osteopathic Etiology and Pathology.—This is a disease of middle life and is more frequently found in women. Sedentary habits and constipation combined with overeating, are other important factors. It is found in stout subjects who are particularly fond of starchy and saccharine food. Catarrhal jaundice is a predisposing factor. Depressing mental influences may predispose. The thicker the bile the more likely it is to deposit. Dr. Still's theory is that lesions of the ribs on the left side from the sixth to the tenth dorsal are factors in the formation of the stones as they interfere with pancreatic secretions. No matter how it comes about, the fact is that in all cases of gall-stones the osteopath finds lesions to the eighth, ninth and tenth ribs on the left side, as well as lesions from the fifth or sixth to the tenth dorsal, deranging innervation to the liver and bile ducts. It is possible that lesions over the spleen probably interfere with the activities of the spleen and thus in some manner this organ does not properly elaborate the blood before it passes to the liver. Sagging of the duodenum may, through tension on the duodeno-hepatic ligament, interfere with the flow of bile. This would cause derangement of the nervous reciprocal relationship between opening at duodenal orifice and gall-bladder. In carcinoma of the liver and stomach, gall-stones are said to be frequent.

The stone itself is a brownish object, nearly spherical, faceted and in some instances polygonal in shape, varying in size from a pea to a hen's egg.

The stones are found anywhere in the biliary tract from the duodenal orifice to the ramification of the bile vessels. Usually there is more

or less of an accumulation in the gall-bladder. At any point the stone may produce ulceration and suppuration. Perforation may occur into the peritoneal cavity or adjacent organs.

Symptoms.—Gall-stones may be in the gall-bladder for years without giving rise to any symptoms. Their presence is made known only by their expulsion from the gall-bladder. If they lodge in the duct in transit from the gall-bladder to the duodenum **biliary colic** is produced, which is the characteristic symptom of an impacted gall-stone. Small stones may pass into the intestine without producing symptoms. The pain is very sudden, piercing and excruciating in the region of the gall-bladder, when a stone attempts to pass. The pain radiates through the abdomen, right chest and shoulder, and the patient writhes in agony and occasionally faints. Downing¹ emphasizes the point that when a patient comes in with a history of repeated attacks of biliary colic and no stone found in the stools one should at once suspect that one of considerable size obstructs the common duct.

There is always tenderness in the biliary region with more or less contraction of the abdominal muscles. Nausea, vomiting and sweating are usually present, followed by a weak pulse, cool skin and pale and anxious face. Fever is soon present and a chill is common. The paroxysms continue as long as the stone remains lodged, which may be from an hour to several days. There are remissions of pain, entire relief being given as soon as the stone reaches the duodenum. Jaundice usually follows a prolonged attack. The liver is sometimes enlarged. The spleen is enlarged. Should the stone become impacted, ulcerative perforation, with consequent peritonitis and shock, follows.

Diagnosis.—The diagnosis is conclusive when the gall-stones are found in the stools or when they can be felt in the gall-bladder. All the above symptoms are characteristic. If a patient complains of severe pain radiating from the hepatic region, and nausea and vomiting are present, subsiding suddenly with a slight jaundice, the disease should hardly be mistaken.

Tenderness over the gall-bladder frequently indicates infection or gall-stones or both. Radiographic examination may be of aid.

Nephritic colic should never be confounded with hepatic colic as in the former the pains start in the lumbar region and radiate downward into the groin, the testicle and the inside of the thigh. In **appendicitis**, jaundice and bile-stained urine are not found. A **pseudo-**

1. Journal of American Osteopathic Association, March, 1905.

biliary colic is occasionally found in nervous individuals especially when the eleventh and twelfth ribs (or ribs as high as the seventh) on the right side are displaced downward.

Prognosis.—Is usually favorable. Ulceration, perforation, and suppuration may prove fatal, although much depends upon surgical interference.

Treatment.—During the attack of **biliary colic**, the osteopath should usually be able to readily locate the position of the gall-stone in its transit from the gall-bladder. He should usually proceed at once to aid the stone in its downward passage by careful manipulation over the duct. Still this treatment should be given with great caution, for if there is suppuration or ulceration, perforation and resultant peritonitis may occur.

Usually one will not have much difficulty in dislodging the stone and relieving the sufferer in a few minutes. The recumbent position, with the thighs flexed on the abdomen, is the position assumed for treatment, and if the muscles in the hepatic region are very tense and rigid, interfering with locating the gall-stone, an inhibitory treatment to the posterior spinal nerves supplying the contracted muscles will aid one materially. An inhibitory treatment of the nerves of the biliary tract (the ninth and tenth dorsals), may be a helpful measure in dilating the duct. Also, hot application over the affected area and to the dorso-lumbar region will aid.

During remissions two or three treatments per week should be given to correct the lesions at the eighth, ninth, tenth and eleventh segments. Give particular attention to any enteroptosis that may be found. Average cases should not require more than two or three months' treatment. Hildreth, who has had many cases, is much opposed to operation as his experience has been that where there is not complete obstruction the correction of lesions will prevent further formation of stones. While he finds the trouble ranges from the third to the eighth dorsal, still, as a rule, it is between the fifth and sixth that best results are obtained. Probably if the treatment is a rightly directed one the stones already formed may be disintegrated. Willard¹ reports 393 cases.

Permanently impacted gall-stones require surgical treatment. Prophylactic treatment, as a regulated diet, daily exercise and a discontinuance of excesses, should be strongly urged. The patient should not be allowed any fatty or saccharine food. Water freely taken will be of aid.

1. Journal of American Osteopathic Association, March, 1905.

Diseases of the Spleen

Diseases of the spleen are usually secondary to other disorders. The following osteopathic treatment under Splenitis will, in addition to the probably primary disturbance, be applicable to active and passive splenic hyperemia and amyloid degeneration of the spleen. Surgical and other measures are to be employed when indicated.

Owing to the role that the spleen plays in infections, the osteopath pays considerable attention to stimulating the organ through its spinal innervation in these cases.

Splenitis

In acute **splenitis** there is generally a blocking up of the smaller splenic arteries by fibrous coagula (hemorrhagic infaret), which have formed in the left ventricle of the heart in consequence of endocarditis. Malarial infections, septicemia, typhus and acute exanthematous fevers may cause coagula formation in the splenic veins. Injuries to the vertebrae or ribs on the left side over the spleen (ninth to eleventh ribs inclusive) are occasionally the predisposing cause of primary inflammation of the spleen. Following the formation of abscesses the entire organ may suppurate; it may produce pyemia, or it may burst and the pus be discharged into the peritoneal sac, causing peritonitis, or into the pleura, stomach or colon. **Chronic splenitis** is induced by passive congestion, leukocythemia and splenic anemia.

Symptoms.—Tenderness and enlargement of the spleen are the principal symptoms. The organ may be twice its normal size, but in a few cases the tumefaction is so insignificant that it can hardly be found on percussion. Dull pain generally exists if the enveloping membrane or adjacent organs are involved, the pain being increased upon percussion and deep inspiration. In a few cases the pain radiates to the left shoulder and if the peritoneal covering is involved, a sharp pain will be present. Fever and rigor follow if suppuration has taken place, and peritonitis follows in case of rupture or perforation. Marked hypertrophy and chronic inflammation may cause cough, nausea, vomiting and dyspnea.

Treatment.—In the treatment of both the disease producing splenitis, and of primary splenitis, a thorough treatment of the spine, eighth to the eleventh dorsal, is necessary. The nerves (vasomotor) to the spleen are from the left splanchnics, consequently treatment of the left side is more effectual. Particular attention should be given the ribs over the spleen—the ninth, tenth and eleventh—as disorders of

these ribs are a common cause of splenic disturbances. Careful and fairly firm treatment is always indicated, care being taken not to add irritation to an already inflamed organ, and especially beware that force is not used where there is danger of rupture. Stimulation of the tenth nerve contracts the spleen. In cases of suppurative splenitis the direct treatment should not be given.

Stimulating treatment over the spleen, as over the liver and kidneys, gives tone to the strong elastic capsule surrounding it, so that direct manipulation over these organs, coupled with the power of the strong elastic capsule and highly elastic tissue of the inner organ, will greatly aid in lessening the engorgement and hyperemia. In a few cases where the spleen is involved, lesions are found in the upper cervical which affect the right pneumogastric nerve and thus impair the normal activity of the gland.

DISEASES OF THE RESPIRATORY SYSTEM

DISEASES OF THE LARYNX¹

Acute Catarrhal Laryngitis

Definition.—An acute, catarrhal inflammation of the mucous membrane of the larynx. This may be ushered in as an independent disease or it may be associated with inflammation of the upper respiratory passages.

Osteopathic Etiology and Pathology.—One of the principal causes of acute catarrhal laryngitis is exposure to cold and dampness, which contracts the muscles of the neck region, especially about the larynx. Lesions in the upper and middle cervical vertebrae are important predisposing causes. Occasionally the first rib becomes luxated, causing a greater or less congestion of the laryngeal mucous membrane by contracting the lower anterolateral muscles of the neck, and affecting lymphatic drainage. Improper placing of tone, as well as too constant use of the voice in speaking and singing, are common causes. Inhalation of irritating gases or dust, and mechanical injuries to the larynx are occasional causes. The disease may be associated with certain infectious diseases, as measles, diphtheria, influenza and whooping cough.

Pathologically, the mucous membrane is intensely reddened and inflamed; this inflammation involves both the true and false vocal cords and may extend into the trachea and about the epiglottis. The membrane is covered slightly with mucous secretion. In rare instances edema of the glottis may occur. The muscular contraction about the larynx impedes blood and lymphatic drainage and thus induces congestion. The contraction may be so severe as to slightly prolapse the organ. The vertebral lesions impinge upon or affect vasomotor fibers and thus bring about congestion.

Symptoms.—There is hoarseness and cough with a sensation of tickling in the larynx; these are the most constant symptoms. The cough is dry and the voice altered. At first the voice is husky, but some attempts at speaking are attended with more or less pain and finally the voice may be entirely lost. Deglutition is painful. At first the expectoration is scanty, but later it becomes mucopurulent. There is rarely much fever. When there is considerable edema, dyspnea and asphyxia are prominent features.

1. For diseases of the nose see Deason, Part I, Page 257.

Prognosis.—Simple catarrhal laryngitis never terminates fatally. When there is dyspnea or asphyxia indicating edema of the larynx, the prognosis is grave. The attack usually lasts from one week to ten days, but this can be materially shortened by careful osteopathic treatment. In severe infections it may be two or three weeks before the larynx returns to its former condition.

Treatment.—In a few cases confinement of the patient to his room, and possibly the bed, will be necessary; especially should the larynx have rest from phonation, and the taking of food of an irritating character should be avoided. Smoking is to be prohibited. The room should be at an even temperature, from 70 to 75 degrees F., and the atmosphere saturated with moisture by the generation of steam.

The tissues in the cervical region about the cervical sympathetic and vagi nerves should be carefully adjusted. The deep posterior muscles of the cervical spine are to be relaxed and direct treatment given over and about the larynx. Relaxing tissues and raising the larynx will be very effectual in relieving the **huskiness** of the voice and in controlling the congestion and inflammation of the laryngeal mucosa. Besides the treatment of the vagi nerves at the atlas and their course down the lateral and anterior portion of the neck, the superior laryngeal may be treated at the upper portion of the great cornu of the hyoid bone and the inferior laryngeal at the inner side of the cleido muscle near its sternal attachment. Adjust the tissues along the course of the external carotid and subclavian arteries, chiefly the first rib for the latter. Give careful treatment to the internal jugular and innominate veins. Correct any tissues that may impinge upon the lymphatics of the mucous and submucous coats of the larynx where they are drained into the deep cervical glands. Release any immobility of the upper chest, relax the pectoral, auxillary and upper dorsal muscles, and adjust the first four or five dorsal vertebrae.

Prompt action of the skin, freedom of the bowels, placing the feet in a hot bath and continued local hot packs, or even an icebag in severe cases, will be of special value at the onset; but due attention should be given these throughout the entire course. The fever is easily aborted by the cervical treatment and proper attention to the bowels and sweat glands.

Chronic Catarrhal Laryngitis

Definition.—A chronic, catarrhal inflammation of the mucous membrane of the larynx.

Osteopathic Etiology and Pathology.—The causes of chronic laryngitis may be numerous, but lesions of the cervical vertebrae are the most common. The contracted cervical muscles, especially the deep vertebral ones, are usually the result of corresponding osseous deviations.

Other causes given under the acute form, as overuse and abuse of the voice, inhalation of irritating substances, excessive use of tobacco and alcoholic drinks, tumors, etc., are important etiological factors. Thus irritations inducing acute attacks, if repeated, will result in chronic catarrh.

The **pathological** changes as revealed by the laryngoscope are swelling of the mucous membrane, occasional superficial erosions, and rarely ulceration.

Symptoms.—The voice is usually hoarse and rough, being due to a thickening of the vocal organs. In severe cases the voice may be lost. There is fatigue and pain after slight use of the voice, a sense of tickling in the larynx which produces a desire to cough, and expectorations of viscid mucus and mucopus.

Prognosis.—The prognosis is sometimes unfavorable, although many cases are cured.

Treatment.—The patient must learn to take care of himself properly. He should avoid overheated rooms and the use of tobacco and alcohol, and the throat should not be protected too much. It is a good plan to bathe the neck every morning and night with cold water. He should avoid loud speaking; the sound should be expelled by the abdominal muscles and diaphragm and not by the muscles of the throat. Examine the upper air passages carefully for any obstructions and infections that might exist which are a source of irritation to the larynx.

Special attention should be given to the atlas, axis and third cervical. Lesions lower down the spine may be found, for other laryngeal nerve fibers, other than those from the superior cervical ganglion, may be at fault. Palpate the **hyoid** to see if it is tilted by contracted muscles, as will often be the case.

Aphonia is commonly caused by a dislocated atlas. The aphonia may also be caused by swelling of the vocal cords and tissues about them and by serous effusions of the laryngeal muscles. The larynx may be prolapsed slightly and if raised quickly relieved. Difficult breathing and hoarseness are occasionally very troublesome symptoms. The former is due to an inability of the glottis to dilate, on account of swelling of the mucous membrane of the diseased parts and from drying of the secretions

on them, thus increasing the obstruction (this is sometimes termed pseudocroup) but expiration is easy, the stridor is from the inspiration; the latter is due to a collection of mucus on the vocal cords or the cords may become relaxed, swollen or roughened.

Another annoying symptom sometimes presented is pain on deglutition, which is due to swelling of the mucous membrane of the upper laryngeal passages and the epiglottis. In all of these annoying symptoms, persistent, thorough, direct treatment of the larynx is of value. On the whole, careful, continued treatment of the cervical innervation and vascular supply of the larynx, as in the acute form, is indicated.

In all laryngeal disorders, if condition permits, hyperextend the neck while the patient is lying supine and thoroughly relax the soft tissues about the organ and then carefully raise it.

Laryngismus Stridulus

(Spasm of the Glottis)

Definition.—A spasm of the muscles of the larynx that are supplied by the inferior or recurrent laryngeal nerves. This is commonly not excited by an inflammatory condition, but it is usually a purely nervous condition.

Osteopathic Etiology and Pathology.—Spasm of the glottis is usually found in children with **enlarged tonsils and adenoids**. It has been observed that rickets and syphilis are probably frequent underlying causes. The spasm is occasionally associated with tetany. The nervous factor is the immediate and important consideration. Cervical lesions, both vertebral and muscular, are invariably found. Then nasopharyngeal and tracheal disorders and reflex digestive disturbance are exciting causes. An elongated uvula or a deranged hyoid bone will occasionally be exciting factors. Subluxation of the upper two or three ribs and of the clavicle may also be exciting factors.

The affection is usually found in children under five years of age. All cases are not of a distinct nervous type, for slight acute catarrhal laryngitis may be present.

Symptoms.—There is a sudden onset and the spasm may occur on waking from sleep, but it may come on either in the night or day. The disease starts with a sudden arrest of breathing, the child struggles for breath; there are tonic muscular spasms and the face becomes congested in a few seconds. This is followed by sudden relaxation of the spasm and the air is drawn through the glottis with a shrill, crowing sound.

Several spasms may occur in a day or they may be weeks apart. Death rarely occurs.

Diagnosis.—The absence of fever, cough and hoarseness and its distinctly intermittent nature will differentiate it from croup. Should there be any question of diagnosis a bacteriological examination is advisable.

Prognosis.—The prognosis is almost always favorable. In very young children death from suffocation may occur, but rarely.

Treatment.—The treatment should be applied either centrally or peripherally, depending altogether upon the location of the irritation. If the irritation is of central origin, that is, through the innervation from the brain and spine, a correction of the superior and inferior laryngeal nerves is necessary; if the stridor is due to peripheral irritations, a correction of the end-plates (muscles) over and about the larynx is required in order that the spasms be relieved.

Thorough treatment should be applied to the upper part of the chest and diaphragm, chiefly the phrenic nerves at the third, fourth and fifth cervicals and over the eighth, ninth and tenth ribs anteriorly, in order that the spasms may be prevented from extending to the intercostal muscles and the diaphragm.

Placing the patient in a hot bath will be of service in some cases when the spasms are severe. Alternating hot and cold packs about the throat are of service. The air of the room should always be kept moist. Care should be taken that the trouble is not due to gastro-intestinal disorders or to dentition. Keep the child upon a fluid diet of milk, meat broths and egg albumin.

In the more severe cases the well known osteopathic method of relaxing and inhibiting the soft palate and contiguous tissues will stop the spasm.

Spasmodic Laryngitis

(False Croup)

Definition.—A catarrhal inflammation of the mucous membrane of the larynx with spasm of the glottis.

Osteopathic Etiology and Pathology.—This affection is practically the same as laryngismus stridulus associated with catarrhal inflammation of the mucous membrane. It is a disease of young children. Derangements of the innervation and blood supply to the laryngeal mucous membrane and muscles of the larynx are found in the same locality as noted under acute catarrhal laryngitis and laryngismus stridulus.

There is acute catarrh causing a croupy cough, and difficult breathing due to spasm of the glottis.

Symptoms.—These attacks generally occur during the night, the child being suddenly awakened by severe paroxysms of suffocating and a dry, hard cough, associated with evidences of dyspnea. In half an hour or an hour or two the coughing ceases, perspiration follows and the child falls asleep. If proper treatment is not given, these attacks may occur for several successive nights, the child appearing almost or quite well during the day.

Diagnosis.—The symptoms are so characteristic that the diagnosis is easy. In all instances the prognosis is favorable.

Treatment.—The catarrhal inflammation of the mucous membrane of the larynx should be treated in the same manner as simple inflammation of the laryngeal mucosa, i. e., thorough treatment of the cervical spine and direct treatment over the larynx.

During the paroxysm, if the patient cannot be relieved very shortly by the cervical treatment, he should be placed in a hot bath of a temperature from 98 to 110 degrees F. This will, in the majority of cases, relieve the attack. In addition a hot compress may be placed about the throat. Producing emesis by irritating the fauces with the finger is necessary in a number of cases in order that the secretions in the laryngeal region may be ejected, thus relieving suffocation and labored breathing. Also, an overloaded stomach which is causing an irritation, should be emptied at once by vomiting. The bowels should be kept well open in all cases. Occasionally the epiglottis becomes wedged in the chink of the glottis. Such a condition requires an introduction of a finger into the fauces to release the disorder.

Care should be taken, especially following an attack, that the child is not exposed to cold or rapid changes of temperature, so as to avoid repetition of the spasms.

Coughing.—Coughing, not only in spasmodic laryngitis, but also in various diseases where coughing is a prominent symptom, is a most irritating and annoying feature. The osteopath is many times called upon to relieve the cough, whether it is due to slight irritation of a nerve fiber alone or is a symptom of a serious chronic disease. The coughing center is located in the medulla oblongata; the afferent nerves are sensory branches of the vagus; the efferent nerve fibers are found in the nerves of expiration and in those that close the glottis. Consequently, coughing may be caused by stimuli to various sensory nerves, various cutaneous areas (chiefly the upper part of the body), mucous membrane of the respira-

tory and digestive tracts, the mammae, liver, spleen, ovaries, uterus, kidneys, etc. Perhaps the most common cause of cough is contraction of some of the muscles of the neck, irritating sensory fibers. Contraction of the omo-hyoid muscle may produce an irritating cough by causing traction on the hyoid bone. In a few cases the larynx may prolapse to some extent and thus be a source of irritation. Lesions of the spinal cord between the seventh and eighth dorsal, also at various points above in the dorsal vertebrae and in the ribs (especially at the second and third ribs), are very apt to produce a cough. Impaction of the sigmoid flexure is oftentimes accompanied by coughing. Enlargement of the heart may cause pressure upon the respiratory tract directly and cause a deep, dull cough. Foreign bodies in the external meatus of the ear are occasionally a source of irritation which is accompanied by coughing. Thus there are innumerable sources of stimuli that may produce coughing. In all cases it is necessary to make a careful diagnosis as to whether it is an irritation to some fiber that can be corrected at once or whether it is a symptom of a disease that can only be relieved by the cure of the disease. In local congestions the cold pack will often be of service.

Tuberculous Laryngitis

Definition.—An inflammation of the laryngeal tissues of tuberculous origin.

Osteopathic Etiology and Pathology.—Tuberculosis of the larynx is commonly secondary to pulmonary tuberculosis. In a few cases the laryngeal invasion may be of primary origin. In either instance there will be found a disturbed innervation or altered blood supply of the larynx that predisposes to the multiplication and growth of the bacilli. The osteopathic lesions are similar to those found in other involvements of the larynx.

Pathologically, the mucous membrane is inflamed and swollen, and exhibits scattered tubercles, which are usually about the blood-vessels. The tubercles cluster, caseate and leave shallow, irregular ulcers. There is thickening of the mucosa about the ulcer, and the ulcer is generally covered by a grayish exudate. They may erode the true vocal cords, often destroying them completely. The ulcers slowly involve the tissues in all directions, causing perichondritis with necrosis of the cartilages. The mucous membrane of the pharynx, esophagus, fauces, and tonsils may be involved, and the epiglottis may be completely destroyed.

This disorder, strictly, should be discussed under pulmonary tuberculosis for, as heretofore stated, it is generally a secondary affection; the larynx being invaded by the tubercular bacilli in the sputum arising from the bronchial tubes and lungs. The bacilli in inspired air may primarily invade the laryngeal mucosa. However, in either case the circulation of the mucosa is not normal and osteopathic correction of the same is effective.

Symptoms.—Huskiess of the voice, followed by hoarseness, and in advanced stages aphonia, are prominent symptoms. A hacking cough is usually present and the patient complains of pain in the throat, particularly on coughing, swallowing or speaking. The loss of voice, painful speaking or whispering are quite characteristic. When the ulceration of the tissues of the larynx has progressed to a later stage, dysphagia, suffocation and distressing paroxysms of cough occur.

Diagnosis.—Is not difficult, as pulmonary phthisis is usually associated with it. Examination of the sputum for the specific bacilli will be conclusive.

Prognosis.—The prognosis is not of the best at any time. On the whole, it is unfavorable.

Treatment.—In this disease osteopathic treatment has been quite effectual. Cases of primary origin are more successfully treated than when of secondary cause, although one will be surprised many times at the results obtained when the disorder is not primary. The treatment must necessarily be both constitutional and local. Care of the general health as to hygiene and diet is absolutely necessary. The food must be nutritious and non-irritating. Scraped beef, raw oysters, raw eggs, soups and gruel are required. In cases where difficulty of deglutition occurs, it may be largely overcome if the patient hangs his head over the side of the bed and sucks through a tube liquid nourishment placed in a dish upon the floor.

The local treatment required is careful, persistent work over the larynx and adjacent tissues. The treatment is given to increase the blood supply to the diseased tissues so that healing may take place, and that the bacteria may be deprived of the conditions favorable to their activity. Treatment along the cervical spine and upper dorsal will aid in correcting the vasomotor disorders that exist. Local application of hot water will assist in relieving the pain. When pulmonary phthisis exists, attention and correction of it is important; in fact, is of primary consideration in laryngeal affection.

Syphilitic Laryngitis

Etiology.—This disease is of frequent occurrence, due to inherited syphilis, or to the secondary or tertiary stages of the acquired form.

Symptoms.—There is a hoarseness of the voice, a hacking cough, difficulty in swallowing and the various symptoms of catarrhal laryngitis. The secondary form may present superficial, whitish ulcers on the cords or ventricular bands, while in a tertiary stage the lesions are extensive and serious. Deep ulcers with raised edges are present, gummata develop on the submucous coat of the epiglottis and there may be necrosis and exfoliation of the cartilages. Deformity is produced by the cicatrices following the healing of the ulcers and sclerosis of the gummata. Edema of the larynx may suddenly prove fatal.

Diagnosis.—The history of the case, the presence of other symptoms of the disease, the deep, symmetrical ulcers, the absence of tuberculosis elsewhere and the absence of marked pain, will usually make a diagnosis easy.

Prognosis.—Is somewhat favorable, more so at least than the tubercular form of laryngitis. There is great danger of deformity and permanent impairment of the voice.

Treatment.—The treatment should be both constitutional and local. Active measures must be taken to rid the system of the virus of syphilis, and thorough, direct treatment should be applied to the larynx and to its innervation. If the cicatricial stenosis has progressed so far that there is little hope from manipulative treatment, tracheotomy or gradual dilatation should be performed. The ulcerated portion is always to be kept clean.

Edematous Laryngitis

Definition.—An acute inflammation of the mucous membrane of the larynx with infiltration of serous fluid into the submucous tissue.

Etiology.—This is a very serious affection. It may occur in connection with acute laryngitis, though rarely, and occasionally with chronic diseases of the larynx, as tuberculosis and syphilis. It may be a complication of some acute infectious disease like diphtheria, scarlet fever, or erysipelas of the face. It sometimes occurs suddenly in the course of Bright's disease. Lesions as in acute laryngitis are predisposing factors.

Pathologically, there is marked swelling of the epiglottis. The swelling can very easily be felt with the fingers. The mucous membrane is tense and changed in color. There is infiltration of a serous or sero-

purulent fluid into the loose connective tissue of the larynx. The arytenoepiglottic folds are greatly involved, and they may be swollen to such a degree that they almost meet.

Symptoms.—Extreme dyspnea and stridulous respiration. Hoarseness of the voice and later aphonia. There is a feeling of intense oppression or suffocation. Evidence of dyspnea, anxious face, blue lips, protruding eyes and retraction of the base of the chest occur. The sterno-cleido-mastoid muscle is very prominent.

Diagnosis.—This is not difficult. The history of the case, laryngoscopic examination, and the swollen epiglottis which can be easily felt with the fingers make diagnosis easy.

Prognosis.—Generally unfavorable. At any time it is extremely grave, but with prompt and vigorous treatment recovery is possible. The duration varies from a few hours to several days.

Treatment.—One must attend strictly and carefully to the laryngeal innervation, as in acute catarrhal laryngitis. Obstruction to the superior or inferior thyroid, facial, internal jugular or innominata will cause tumefaction and edema of the larynx and adjacent tissues. Also, enlargement of the lymphatics about the larynx and salivary glands may produce edema of the laryngeal region; consequently, particular care should be taken of the various tissues about these vessels and of the innervation from the cervical spine, so the veins are not obstructed or the lymphatic channels disordered, so that infiltration of the tissues may be further prevented.

The most prominent symptom is laryngeal dyspnea and this depends altogether upon the swelling of the soft parts. If the swelling is great and the disorder cannot be removed, suffocation will follow. In such cases, besides giving direct treatment over the larynx, introducing a finger into the mouth, and reaching clear back under the roof of the soft palate, with a firm, downward, outward and sweeping movement on either side, relax the soft tissues. The persistent use of small pellets of ice, held far back in the mouth, will be found very beneficial; also, application of the ice-bag, provided the edema is of inflammatory origin.

If one is not able to control the rapid infiltration of the larynx and glottis when such cases arise, tracheotomy or intubation should be performed at once. When edematous laryngitis is due to diseases of the heart, lungs and kidneys, treatment of the primary disease should be given in addition to the local treatment.

DISEASES OF THE BRONCHI**Acute Bronchitis**

Definition.—A catarrhal inflammation of part or whole of the mucous membrane of the larynx, trachea and bronchial tubes, or it may extend into the capillary tubes. This is bilateral, affecting more or less the bronchial tree in both lungs.

Osteopathic Etiology and Pathology.—The most common cause of acute bronchitis is "catching cold." It is more prevalent in the winter, and it often succeeds an ordinary cold in the head, coryza or laryngitis, the inflammation extending downward from the upper air passages. A case of acute bronchitis always presents a contracted condition of the muscles on either side of the spine in the upper dorsal region. The contracted muscles may extend as far down as the middle dorsal or as high as the entire cervical. Occasionally, the ribs posteriorly are drawn downward by the extreme contraction of the muscles, and the upper anterior part of the chest may be somewhat constricted and limited in its movements by the tensed muscles. Thus, in a few cases the ribs and upper dorsal vertebrae are actually sub-dislocated by the extreme contraction of the muscles. The principal points affected are the second, third, fourth and fifth dorsal regions. In a few instances cervical lesions disturbing the vagus and resulting in motor weakness of the tubes, will be noted. The osteopathic control of the bronchial vasomotor nerves is in this region (dorsal).

The disease is also associated with measles and it is usually a symptom of influenza. One attack predisposes to another. It affects either sex and especially children and the old, in whom it most frequently involves the smaller bronchi. In adult life it involves the larger bronchi. Micro-organisms, particularly the pneumococcus, influenza bacillus, and micrococcus catarrhalis, act as exciting causes.

Pathologically, the mucous membrane of the portion of the trachea and bronchi that are implicated become reddened, congested and more or less covered with a tough mucus mingled with epithelial cells. The hyperemia is most marked about the mucous glands. Some of the smaller bronchial tubes are dilated. In severe cases there is desquamation of the ciliated epithelium, swelling and edema of the sub-mucosa, and infiltration of the tissues with leucocytes. The affection involves chiefly the vasomotor nerves. In cases on the verge of chronicity, look well to the diet; especially lessen in amount the starchy and saccharine foods.

Symptoms.—The onset of acute bronchitis is accompanied by the symptoms of a common "cold." In the beginning the cough is hard and dry without expectoration; but later it is looser, the secretion becoming mucopurulent and abundant and finally purulent. The scanty sputum is at first glairy and mucoid, while later it becomes more abundant and mucopurulent and contains pus-cells and desquamated epithelium. When the bronchial inflammation becomes fully established, there is a feeling of tightness and rawness beneath the sternum and a sensation of oppression in the chest, due to swelling of the mucous membrane and the presence of secretions which cause stenosis of the bronchial lumina. There is a slight fever, rarely exceeding 101 degrees F. The disease lasts from four or five days to three weeks. There is either a complete recovery or chronic bronchitis is developed.

Physical Signs.—There may be no physical signs in slight attacks of acute bronchitis of the larger tubes. In severer cases the physical signs are well marked. **Inspection** may recognize increased frequency of breathing, and when the smaller tubes are involved there is dyspnea. **Palpation.**—The bronchial fremitus may often be felt, providing there is sufficient narrowing of the breathing tubes. **Percussion.**—Sounds are normal as long as the bronchitis is uncomplicated. **Auscultation.**—In the early stage piping, sibilant rales may be heard on both sides. These rales are inconstant and appear and disappear with coughing. There may be harshness of breathing added to these. When resolution sets in, the rales change and become mucous and bubbling in quality. Vocal resonance in bronchitis is normal, unless complications occur.

Diagnosis.—This is generally easy. The absence of dullness and blowing breathing and the bronchial character of the cough and expectoration are usually sufficient to distinguish it from pneumonia and pleurisy. If the physical signs are noticed carefully, the diagnosis is rendered easy and positive in all cases.

Prognosis.—In the very young and the very old, the prognosis is unfavorable, but in a previously healthy adult the most that can happen to a case of acute bronchitis is to become chronic. Recovery is the rule; even in the aged and feeble death is rare. If osteopathic treatment can be instituted from the inception, the disease will probably be aborted. The treatment almost invariably lessens the severity and duration of an attack. For capillary bronchitis see Bronchopneumonia.

Treatment.—Complete rest in a warm bed, and a hot foot bath would cure a large majority of cases in a day or two if the patient would only submit to such treatment. Most of them wish to be around and

out doors and very likely attending to their usual work, so that a cure in some cases is hard to perform. They are very liable to take more "cold" and in a few cases it will take great effort to prevent the bronchitis from becoming chronic. One thorough treatment per day will usually be sufficient.

The hyperemic condition of the bronchial tubes is due to a vasomotor disturbance, generally caused by a severe contraction of the muscles of the back in the region of the first to fourth dorsal; although the vasomotor nerves to the mucous membrane of the bronchial tubes may be affected anywhere from the first to the seventh dorsal inclusive. Contraction of the muscles over the anterior part of the chest corresponding to these regions and caused by the same influences (chiefly atmospherical changes) is of quite common occurrence. In the majority of cases the contraction of the chest and back muscles is so severe that the ribs are partly displaced by the tension and thus is added a complication to the disorder, and from this complication chronic bronchitis is liable to occur. The ribs or even vertebrae to the corresponding region oftentimes remain partly dislocated and are a source of continued and permanent irritation to the innervation of the bronchial tubes. So it is always necessary in treating any form of bronchitis to see at each treatment that the ribs and vertebrae from the first dorsal to the seventh dorsal, inclusive, are anatomically correct.

As has been stated, the disordered muscles or ribs may be affected anteriorly as well as posteriorly; consequently, the treatment applied is a thorough relaxation of the chest and back muscles and the correction of the ribs and vertebrae in order that the vasomotor disturbance of the bronchial mucosa may be corrected and the inflammation relieved. An excellent method to release the immobilized anterior upper chest is to place patient flat upon his back with pillow beneath upper dorsal. This hyperextends spine, enlarges spinal foramina, and tends to elevate ribs. Then by use of arms as levers, moderate inspiration, and employment of one hand over anterior end of ribs they may be easily released and raised. This treatment effects circulation, innervation, lymph tissue, and rib bone marrow.

In addition to the dorsal spinal nerves, and the sympathetic, the vagi are to be considered in the treatment of bronchitis, as all of these nerves, sympathetic, spinal, and vagi, go to make up the anterior and posterior pulmonary plexuses from which the bronchial mucosa receives its innervation. The veins particularly involved in passive hyperemia of the bronchial tubes are the superior intercostal and azygos major;

so raise and spread the ribs to give greater freedom to these bloodvessels.

"The blood flow may be diverted from the bronchi to the abdomen by a slow, deep, inhibitive treatment over it, including pressure over the solar and hypogastric plexuses." (Hazzard).

The excretory organs and the diet of the patient should be attended to. Especially in children, the diet had best be a fluid one, as milk, egg albumin, meat broths and meat juice. For those who are subject to the disease an outdoor life is best.

Chronic Bronchitis

Definition.—A chronic inflammation of the mucous membrane of the large and middle sized bronchial tubes.

Osteopathic Etiology and Pathology.—Chronic bronchitis may be either primary or secondary. The primary form is the result of exposure to wet and cold or to the daily inhalation of irritating vapors or dust. This form is rare, the affection being almost always a secondary one, and is most commonly met with in chronic lung affections, heart disease, gout or renal disease. It may be caused by any disease which favors congestion of the air tubes by obstruction of the circulation; especially mitral diseases and Bright's disease. It is also caused by chronic alcoholism and may be the result of repeated attacks of the acute form. Chronic vertebral and rib lesions are found from the first to the seventh dorsal, inclusive. Elderly people are often subject to the disorder.

Pathologically, the lesions of chronic bronchitis present great variation, as to both their nature and extent. In some cases the mucous membrane is atrophied, so that some of the elastic fibers are noticeable. The epithelial layer is in great part missing. The muscular coat and mucous glands are atrophied.

In certain cases the mucous membrane of the bronchi is thickened, and there may be ulceration. In long standing bronchitis, there is frequently dilation of the tubes (bronchiectasis) and emphysema.

Symptoms.—Pain is rarely present; there is merely a feeling of constriction beneath the sternum. The cough varies with the weather and season and there is often an absence of the cough during the summer. It is apt to be worse at night than in the morning, and is frequently paroxysmal. There is rarely any fever. As a rule, there is free expectoration of mucopurulent or distinctly purulent matter. Sometimes it is abundant, seromucous in character, and again there are severe cases of dry cough in which there is almost no expectoration. Unless asso-

ciated with other diseases, the general health suffers but little, if at all. The appetite, as a rule, is good and the body weight is well maintained.

Physical Signs—Inspection.—There is considerable immobility of the chest and if emphysema is present there is distension. **Percussion** is clear, and hyperresonant in emphysema. **Auscultation.**—The expiration is prolonged and forcible. This is associated with sonorous and sibilant rales and moist rales of all sizes.

Special Varieties.—Bronchorrhea, dry catarrh, putrid bronchitis or fetid bronchitis.

Bronchorrhea.—In this form there may be an excessive bronchial secretion. This may be liquid and watery, but more frequently it is purulent, thin and containing greenish masses; or again it may be thick. Dilation of the tubes and fetid bronchitis may be developed.

Fetid Bronchitis.—Fetid expectoration is associated with gangrene of the lungs, abscesses, bronchiectasis, decomposition of matter within phthisical cavities, or empyema with perforation of the lungs; or it may occur independently. There is considerable expectoration that is thin and offensive. When **putrefactive changes** take place during the course of chronic bronchitis, as a rule, the following symptoms immediately appear: fever, which may be septic; increase of cough; pain in the side, and sometimes a chill. There is increased prostration. The symptoms may abate followed by the usual course of bronchitis.

Dry Catarrh.—The cough is distressing and paroxysmal. It is usually associated with emphysema and is a very troublesome form.

Diagnosis.—This is not usually difficult. Phthisis—the absence of fever, of hemorrhage, of tubercle bacillus and the signs of localized consolidation (usually at one or other apex) will serve to distinguish between the two.

Prognosis.—Recovery is not always accomplished. The diseases being generally a secondary affection, the prognosis must depend upon the primary condition. The danger from development of emphysema, bronchiectasis and dilatation of the right ventricle must be thought of. Frequently cures will be obtained, even in old persons. Care must be taken that there are no serious organic lesions. Deep treatment to re-adjust the upper and middle dorsals is most essential.

Treatment.—In the first place there must be a careful regulation of the hygiene of the patient. The diet should be a nutritious one, care being taken to give food that is easily digested. A liberal diet can easily be selected from the various meats, vegetables, cereals, fruits, soups, broths, eggs and milk. The clothing should be carefully selected. Flan-

nel should be worn next the skin the year around, care being taken that the sufferer is not too warmly clad. Due attention should be given to bathing, exercising, etc. The patient should be out in the open air a great deal, but be careful that it is not too stormy. The air of the room should be kept at an even temperature and not subject to abrupt changes. Two or three treatments per week will be required, and when the condition is considerably aggravated, do not hesitate to treat oftener, but be careful not to unduly irritate the lesions.

Lesions will be found to the ribs and vertebrae from the first to the seventh dorsal inclusive. Many cases present lesions in the vertebrae from the second to fourth, usually of a lateral nature. Other lesions of frequent occurrence are displacements of both vertebrae and ribs. Correcting these deviations relieves the chronic inflammation of the tubes. Also in those cases where dilatation of the bronchial tubes occurs, the obstruction to the motor fibers is to be removed by the correction of the vertebrae and by removing obstruction to fibers of the pneumogastric; the fibers of the latter supplying the transverse muscles of the bronchial tubes.

It generally requires a considerable course of treatment for the cure of chronic bronchitis, and one of the hardest things to contend with in the treatment is the likelihood of the patient "catching cold." When a fresh cold gets thoroughly started, it is almost impossible to prevent the disease from extending down the bronchial tubes, as the innervation is less rich in the smaller tubes.

Hazzard says: "The obese should be taught the habit of deep respiration, as should all persons subject to the attacks of the disease. This measure, together with the daily cold sponge or shower bath, is a great aid in overcoming the chronic tendency."

Those cases that are due to cardiac or nephritic diseases require the treatment of the primary disease in addition to a light bronchial treatment.

A lesion between the gladiolus and manubrium of the sternum may be found, but it is of rare occurrence in these cases. The upper portion of the sternum may be held very rigidly and slightly underneath the middle portion of the sternum; or at the point of articulation of the two portions a distinct ridge may be found, caused by the articular ends being pushed anteriorly. Probably such lesions affect the innervation to the bronchial tubes and lung tissues. Associated with this condition the upper chest is considerably immobilized, affecting the lymph and rib bone marrow function. Examine the first ribs and clavicles carefully. Changes of climate are often beneficial.

Fibrinous Bronchitis

Definition.—A rare, acute or chronic inflammatory disease of the bronchi, in which a fibrinous mould of the bronchus and its branches is formed. These are expelled in paroxysms of cough and dyspnea. The casts block the bronchial tubes. When these moulds are large or medium sized, they are generally hollow, while those of the smaller bronchi are solid.

Etiology and Pathology.—The causes are unknown. Young men, between the twentieth and fortieth years, are the usual subjects; but the disease may occur at any period of life. Lesions occur as in other forms of bronchitis. The attack occurs most frequently in the spring months. In some cases there seems to be some hereditary influence. Chronic pulmonary diseases, like phthisis, emphysema and pleurisy, are occasionally predisposing causes. It is sometimes associated with skin diseases, such as herpes, impetigo and pemphigus.

The **pathology** is not known. The masses that are expelled are usually round and mixed with blood and mucus. The casts are more dense, but the membrane is identical with that of croupous exudates. This affection, however, is limited to certain bronchial tubes and recurs at stated or irregular intervals, sometimes for a period of several years. There is loss of epithelium in the affected bronchi and the submucous tissue is often swollen and infiltrated with serum.

Symptoms.—Acute cases are rare. The attacks may set in with rigor, high fever, pain in the side, soreness, severe paroxysms of cough and sometimes a slight hemoptysis. The symptoms are those of an ordinary acute bronchitis, but of severer character; aggravated cough and dyspnea and fatal termination are not uncommon. Death occasionally results from suffocation. There may be but one attack without any recurrence, but in the chronic form the paroxysms recur at irregular intervals, though they are less severe than in the acute form.

The disease may last for ten or even twenty years, the attacks recurring weekly, or a period of a year or more may intervene. The onset is marked by bronchial symptoms with or without fever. The cough soon becomes distressing and paroxysmal in character. The sputum may be blood-stained and occasionally there is profuse hemorrhage. The expectoration is in the form of ball-like masses which, when unraveled are found to be moulds of the bronchi. They may be hollow and laminated or quite solid. When examined under the microscope they are seen to consist of a fibrillated membrane in which are imbedded leucocytes,

mucus, corpuscles, fat drops and epithelial cells. Leyden's crystals and Curschmann's spirals are occasionally found.

Physical signs are usually those of bronchitis. The weakened or suppressed breath sounds in the affected territory may occasionally be determined. There is sometimes a diminished expansion or even retraction of the chest wall over the affected area. There is no dullness on percussion, unless the portions of the lung supplied by the affected tubes collapse. After dislodgement of the casts, the normal respiratory murmur returns.

Diagnosis.—The fibrinous casts alone are sufficient for a positive diagnosis.

Prognosis.—Generally favorable. In uncomplicated cases there is rarely any danger, even though there may be severe paroxysms of cough and dyspnea. In fatal cases the lesions of associated or preceding affections have been found, such as chronic pleurisy, pneumonia and phthisis. Although this is a rare disease, cases have been treated with success by osteopathic means. If uncomplicated there should be a fair chance for a cure, depending, of course, upon the constitutional condition and the permanency of the lesions.

Treatment.—The treatment is largely that of acute bronchitis. The disorder is more extensive than in acute bronchitis, consequently severe subluxations of the ribs and vertebræ of the upper and middle dorsals occur, besides extensive muscular contractions of the chest and neck. The fibrinous casts are somewhat of the same nature of membranous exudates elsewhere, therefore the treatment should be directed to a correction of the hyperemia of the mucous membrane of the bronchial tubes, thus loosening and disorganizing the exudate. The vagi nerves supply a part of the innervation to the bronchial tubes and lungs. Any disorder to them should be corrected when diseases of the bronchial tubes and lungs exist. They contain motor fibers to these organs, and to the bronchial tubes they supply, principally the transverse fibers. In bronchitis of various forms, marked effect can be secured by close attention and treatment to the inferior laryngeal nerve. This is best treated at the inner side of the lower portion of the sterno-cleido muscle.

The different forms of bronchitis illustrate the point so often noted in osteopathic etiology and pathology, that the various affections of the same region should not be studied so much as types of several diseases or disease entities as different degrees of involvement, depending on the severity of the causative lesion, the function of the nerves disturbed, and the character of the tissues. It is straining a point to diagnose and

classify many diseases according to signs and symptoms instead of studying the process from central causes, for, at best, peripheral manifestations, micro-organisms, etc., are really incidental to the importance of the primary source of disturbed nutrition. Consequently, the same treatment, if scientific, is frequently indicated for all of the disorders that may affect a given locality. After all has been said and done, the therapy as well as the pathology, must hinge upon the fundamental—uninterrupted blood channels and nerve courses are essential to health. Whether a disease is of primary or secondary origin, or whether or not it presents different symptoms in various types, the above basic principle is invariably applicable. This simplifies etiology, pathology and treatment and furnishes a backbone to theory and practice, and some day rational medicine will adopt it.

Bronchiectasis.

Bronchiectasis is a dilatation of a part or the whole of the bronchial tube. As a rule this affection is a secondary one, the most common cause being chronic bronchitis. The inflammation weakens the bronchial walls so that they are unable to resist the strain that is put upon them during violent paroxysms of coughing. After dilatation has once commenced, the weight of the secretion which accumulates tends to further distend the weakened walls and the elasticity, becoming impaired, is finally lost. Dilatation of the bronchi is also associated with emphysema, compression of a bronchus, aneurism or mediastinal tumor, bronchopneumonia, measles and whooping cough in children, and also traction associated with fibroid induration. Hence the bronchial dilatation is especially associated with bronchitis, interstitial pneumonia, and sometimes chronic pleurisy. It is rarely a congenital effect in such cases. It is commonly unilateral. The lesions presented to the osteopath are largely like those found in chronic bronchitis, i. e., derangement of the upper four or five dorsal vertebræ and ribs, and lesions of the cervical vertebræ involving the vagi. These lesions obstruct the nerve force to the bronchial tubes and thus cause the dilatation.

Pathologically, the dilatation is usually either cylindrical or saccular, which may occur in the same lung. The entire bronchial tree may be converted into a series of sacs opening into each other. These have smooth, shining walls in the most dependent parts which are sometimes ulcerated. In extreme conditions the dilatations may form large cysts immediately beneath the pleura; as a rule, the lung tissue lying between the sacculi becomes cirrhotic. **Partial dilatation** is more

common. The bronchial mucous membrane is involved with an occasional narrowing of the lumen. The narrowings are most commonly cylindrical, sometimes saccular.

In all forms there is decided change in the bronchial wall. In the large dilatations, the epithelium is changed. The elastic and muscular layers are thin and atrophied. These dilatations frequently contain fetid secretions and when these secretions are retained, the lining membrane becomes ulcerated.

Symptoms.—There is always cough, which occurs in severe paroxysms. In some cases a change of position will cause a paroxysm of coughing—very likely due to the emptying of the contents of a dilated tube into a normal one. The sputum is mucopurulent and is greenish brown in color, is fluid, and has a sour, or more frequently, a fetid odor. On standing, it separates into three layers; the upper is frothy and thin, the middle mucoid, and the lower is a thick sediment of cells and granular debris. Microscopically, the sediment consists of pus corpuscles, fatty acid crystals which are arranged in the form of bundles, and sometimes red blood discs and hematoidin crystals. Elastic fibers may be found if ulcers are present.

Physical Signs.—When distinctly present, they are those of a cavity in the lungs. When chronic pleurisy and interstitial pneumonia are associated, there may be retraction of the chest wall. The percussion resonance is impaired. On auscultation, bronchial, or even amphoric, breathing is heard occasionally with metallic rales.

Diagnosis.—In a number of cases this was formerly impossible, where the X-ray is now proving of great assistance. History, paroxysmal cough, characteristic copious sputum and an absence of tubercle bacilli with little impairment of the general health will serve to distinguish bronchiectasis from pulmonary tuberculosis. Circumscribed empyema which has ruptured into the lung may simulate bronchiectasis. This is of a much more sudden onset, has a history of previous pleurisy, the health is gradually impaired, and there is thoracic oppression and dyspnea on the slightest exertion.

Prognosis.—Is generally unfavorable. However this largely depends upon the cause.

Treatment.—Largely the same as in chronic bronchitis. Severe lesions are found in the dorsal vertebræ about the region of the third, fourth and fifth, and many times lesions of the pneumogastric at the upper cervical vertebræ are also found. The lesions are much of the same nature as those of bronchitis, but, as a rule, there is a much deeper

or more extensive lesion. These lesions weaken the motor innervation to the muscular coats of the bronchial tubes, and in many instances the extensive lesions involve the vasomotor nerves controlling the blood supply to the bronchial tubes. In most cases marked lesions of the ribs on either side will be found, usually in the region corresponding to the affected vertebræ.

The position of the patient is important; the head should be low in sleeping. In certain fetid cases surgery should be considered.

Care should be taken as to the hygienic surroundings of the patient. The diet should be carefully regulated and nutritious, as in chronic bronchitis.

Bronchial Asthma

Bronchial or spasmodic asthma is a chronic affection, characterized by a paroxysmal dyspnea due to a spasmodic contraction of the muscles of the bronchial tubes or to swelling of their mucous membrane.

Osteopathic Etiology and Pathology.—The majority of lesions causing bronchial asthma are from the second to the seventh dorsal region, inclusive, either in the ribs posteriorly or anteriorly, or in the vertebræ. These lesions involve vasomotor nerves to the bronchioles which produce the narrowing of the tubes and thus cause the dyspnea. Usually the lesion is at the third, fourth or fifth rib on the right side, although, as stated, a lesion may be found above or below this point at the anterior or posterior ends of the ribs or in the vertebræ corresponding to the same region. Probably lesions are found more on the right side, because most people are right handed; these muscles being better developed would tend, when contracted, to draw the ribs from their articulation. The third, fourth and fifth ribs are usually found involved because it is the region of greatest vasomotor innervation to the bronchial tubes.

In a number of cases there will be found a posterior curvature of the dorso-lumbar region; and accompanying this condition will be catarrh and dilatation of the stomach, congestion of the liver, and, perhaps, intestinal indigestion and constipation. Careful attention should be given to the digestive organs.

Lesions involving the pneumogastric at the atlas and axis are fairly frequent. These irritate fibers of the pneumogastric to the muscles of the bronchioles and thus produce narrowing of the tubes and consequently the paroxysms. Other points to note are the costal cartilages and hyoid bone, and probably, in a few instances, lesions to the phrenic.

Attacks may be induced reflexly by various excitants, as dust, diseases of the upper respiratory tract, etc., but the lesions to the vasomotor

and motor nerves are the predisposing causes. Laughlin¹ says: "It is questionable whether reflex causes alone are sufficient to produce genuine asthma without the existence of specific lesions affecting the direct nerve connections of the part involved." No doubt a neurotic tendency is often a predisposing factor. Overeating, and particularly certain foods will frequently excite an attack.

Pathologically. true asthma is a pure neurosis. There is more or less chronic inflammation of the bronchial tubes, shown by injection and thickening of the bronchial mucosa in the majority of cases. There may be found the morbid states peculiar to chronic bronchitis and emphysema. Whether the constriction of the tubes is due to spasms of the bronchial muscles or to swelling of the mucosa, or to both, the primary, predisposing and irritating influences are common to both. These are vertebral and rib lesions affecting the spinal nerves at their exit and the sympathetic chain along the head of the ribs; irritating lesions to the vagi, constricting pulmonary vessels, and to the cervical sympathetics, causing disturbance of the same, would be factors in the pathological chain. Reflex irritations may be found in various regions, but the principal osseous lesions, according to Dr. Still, are on the right side from the second to the sixth dorsal.

Symptoms.—The attack may come on at any time, but usually it comes on in the night during sleep. The onset may be sudden or the attack may be preceded by premonitory sensations, such as tightness in the chest, flatulence, sneezing, chilliness and a copious discharge of pale urine. Nervous symptoms, headache, vertigo, neuralgia, and an anxious, nervous, restless feeling may precede the attack. There is a sense of oppression and anxiety, followed by dyspnea. Soon the respiratory efforts become violent, the patient is obliged to sit up or runs to the window for air. The shoulders are raised, the hands are placed upon something firm to keep the shoulders fixed so that the accessory muscles of respiration can be brought into play. The contracted tubes resist the entrance of air. Expiration is prolonged and wheezy. In severe cases the face becomes pale, the skin is covered with perspiration, the extremities are cold, the lips, finger-tips and eyelids are livid, owing to defective oxygenation of the blood. The pulse is small and quick and the temperature is normal or subnormal. The attack may terminate suddenly, sometimes with a spell of coughing; this is especially so of severe cases, as the cough is generally absent in brief paroxysms.

1. Laughlin—Asthma—Journal of the American Osteopathic Association, Oct., 1914.

The **cough** is at first very tight and dry and accompanied by a tough, scanty expectoration which is expelled with great difficulty. The **sputum** contains rounded masses of matter, the so-called "pearls" of Lænnec. Microscopically, they are found to be of a spiral structure, containing cells derived from the bronchial mucous membrane and fatty degenerated pus cells. A second form is contained in the inside of the coiled spiral of mucin, a filament of great clearness and translucency, that is most probably composed of transformed mucin. Curschmann's spirals are found in the early stages of the attack and for a time these were supposed, by their irritation, to excite the paroxysms. Their spiral form is unexplained. Curschmann believes that these spirals are found in the finer bronchioles and to be a product of bronchiolitis.

Physical Signs.—Inspection shows enlargement of the chest which is fixed and barrel-shaped. The breathing is labored and the chest moves but slightly. The diaphragm is lowered and fixed. **Per-cussion** yields hyper-resonance, especially in cases which have had repeated attacks or when the asthma is associated with emphysema. **Auscultation.**—With inspiration and expiration are heard sonorous sibilant rales which are more marked on expiration. As the secretion increases, which is later in the attack, the rale becomes moist. The attack lasts for a variable period, rarely less than an hour. In severe attacks the paroxysms recur for three or four nights or more with spontaneous remissions during the day. In some cases the relief seems to be absolute, but in the majority of cases there is more or less oppression and cough for a day or two, sometimes for many days.

Diagnosis.—The physical signs, examination of the sputum and the history of the case makes the diagnosis easy.

Prognosis.—It is not a fatal disease and only dangerous when complications arise. Under osteopathic treatment the prognosis is usually favorable, unless there are serious complications, as this is a disease that osteopathy has treated with signal success. In long standing cases emphysema invariably develops.

Treatment.—Asthma, unless complicated with bronchial and lung diseases, is usually readily relieved during the paroxysms. Cases of many years' standing have been cured in a few treatments. It should be borne in mind that asthma is a respiratory neurosis.

To relieve an attack the osteopath should locate the lesion and, if possible, correct it. Oium¹, in the acute attack, standing at the head of his patient inserts the tips of both thumbs well under the angles of the

1. Journal A. O. A. 1918.

jaw and then brings direct pressure on both vagi as they pass over the transverse processes of the axis. Pressure must be brief and let up to be applied again. Immediate relief is given in many cases. Adjust upper three cervicals if found deranged.

If the muscles are so severely contracted that it is impossible to make out the nature of the lesion, then strong inhibition, with an upward, outward movement over the angles of the ribs involved, will be sufficient. The object to be gained in every case is to relieve pressure or irritation to the vasomotor or motor nerves, so that the narrowed tubes may be relaxed. Strong inhibition, such as placing the knee in the patient's back, at the same time pulling on the shoulders, will have temporary effect, but it is always best to reduce the lesion if possible. In severe cases dilatation of the rectum may relieve the paroxysm, and in a few instances it will be necessary to treat the uterus locally.

During the interval between the attacks is the time to remedy the disease. Then one is able to locate exactly the position of the disturbed tissues that are causing the paroxysms and apply treatment in the regions given under etiology. Many cases of asthma are cured in from one to three months' treatment. One treatment a week is sufficient, provided one is able each time to accomplish something toward a correction of the lesion and that the patient does not suffer during the meantime. Too frequent treatments may simply act as an irritant to the nervous lesions.

Attention should always be given to the diet and hygiene. Gastric digestion should be complete before retiring or it may induce an attack. Complications are treated according to the disease. Examine the upper respiratory tract, the digestive tract, and the pelvic organs when there is reason to believe the paroxysm may be induced reflexly. Laughlin sums up the treatment as follows: (1) Removal of specific lesion; (2) removal of exciting causes; (3) removal of reflex causes; and, (4) treatment of the patient to improve the condition of the general nervous system.

DISEASES OF THE LUNGS

Emphysema

Used in a general way, emphysema is a term which implies the presence of air in the interstitial tissue, but when applied to the lungs there are two applications of the term, having widely different significations, viz: Interlobular or interstitial emphysema and vesicular emphysema.

Interlobular Emphysema.—This is caused by rupture of air vesicles, deep in the lung structure, the air escaping into the interlobular connective tissue. It is not a very serious condition, rarely produces symptoms and affords no physical signs. It usually results from violent acts of coughing in which the expiratory strain is very great, as in whooping cough and in bronchial asthma; also, from wounds of the lung.

The air bubbles escape into the interlobular septa and are sometimes seen like little rows of beads outlining the lobules. The pleura may become detached and larger vesicles may form. In rare cases the rupture may take place at the root of the lung and the air passes along the trachea into the subcutaneous tissue of the neck and chest wall, which gives rise to a very peculiar and distinctive crepitation upon palpation. Rarely there is rupture of the superficial vesicles, producing pneumothorax.

Vesicular Emphysema.—Dilatation of the infundibular passages and alveoli or an increase in their size either symmetrical, involving both lungs, or localized. Vesicular emphysema is divided into compensatory, hypertrophic and atrophic forms.

Compensatory.—This occurs when a region of the lung has been disabled from any cause and does not expand fully during inspiration; the healthy portion of the lung must then distend and do vicarious work or the chest wall will sink in to occupy the space. This happens with portions of healthy lungs in the neighborhood of tubercular areas and cicatrices, areas of collapsed lung or parts prevented from expansion by pleuritic adhesions (in this case the compensatory emphysema is chiefly at the anterior margins of the lungs). As a rule this distention is physiologic and beneficial, the alveolar walls being simply stretched. Later they may, atrophy, the air cells becoming fused.

Hypertrophic Emphysema.—This is enlargement of the lung, due to dilatation of the air vesicles and atrophy of the walls.

Osteopathic Etiology and Pathology.—An important predisposing cause of emphysema is often found to be due to derangements of the tissues, usually vertebræ and ribs, which affect the innervation to the lung tissues. Such lesions are found in the vagi and spinal dorsal nerves. The atlas may be involved, but it is generally the ribs and dorsal vertebræ. Distinction should be made between cause and effect in the skeletal changes. No doubt in many instances a vicious circle is thus established. Congenital weakness of the lung tissues, probably due to non-development of the elastic tissue, is a predisposing factor. This disease has a markedly hereditary character and frequently starts

early in life. The heightened pressure within the air cells upon an already weakened lung tissue produces emphysema. Hence, the obstinate cough of chronic bronchitis and expiratory straining of asthma are sometimes the immediate cause. In all attacks of severe coughing or straining efforts, the glottis is closed and the air is forced into the upper part of the lungs, forcibly expanding them, and here is where emphysema is found to be most advanced. This disease is also found in players of wind instruments, in glass blowers and in those whose occupation necessitates heavy lifting or straining.

Pathologically, the thorax is barrel-shaped. The lungs are enlarged and do not collapse when the thorax is opened, as they have lost their elasticity. The organs are pale, soft and downy to the feeling and pit on pressure. Enlarged air vesicles may readily be seen beneath the pleura. Microscopically, there are seen atrophy of the vesicular walls and a diminished amount of elastic tissue. There is more or less obliteration of the capillaries, and the epithelium of the air cells undergoes a fatty change. There is usually chronic inflammation of the bronchial tubes, which may be roughened and thickened. The diaphragm is lowered and the subjacent viscera are displaced. The most important morbid changes are found in the heart, the right chamber being dilated and hypertrophied. This is caused by the increased tension in the pulmonary artery, which is enlarged and the seat of atheromatous degeneration. In long standing cases the hypertrophy is general. Changes in the liver, kidneys and other viscera are those associated with prolonged venous engorgement.

Symptoms.—The onset of the disease is usually gradual. The first symptom to be noticed is the shortness of breath. In rare cases it may exhibit a more acute development, as after whooping cough, and then the first symptom will be dyspnea. In some cases this persists all the time, while in moderate emphysema the dyspnea is noticed only on slight exertion, such as going up-stairs, running or walking rapidly. The lungs are always filled with air which is charged with carbon dioxide and does not change, as the patient is constantly making ineffectual efforts to draw in air. The inspiration is shortened and the expiration is greatly prolonged and is often harsh and wheezy. The pulse-rate is accelerated; the temperature is usually normal. Cyanosis is a characteristic symptom in well established cases and is of an extreme grade not seen in any other affection. Bronchitis is frequently found in combination, especially in winter. In this case there will be the symptoms of the associated bronchitis, cough, expectoration and sometimes oppression. As the patient

advances in age and there are successive attacks of bronchitis, the condition gets worse. In advanced cases, the result of cardiac failures, there may be venous engorgement, dropsy and effusions into the serous sacs.

Physical Signs.—Inspection.—There is a marked change in the shape of the thorax. The chest is rounded with increased circumference, giving the characteristic barrel-shaped chest. The sternum bulges, as do also the costal cartilages. The intercostal spaces are wide, especially in the hypochondriac region, and narrow above. The clavicles and muscles of the neck stand out with great prominence and the neck itself seems to be shortened on account of the elevation of the thorax and sternum. The curve of the spine is increased and there is a winged condition of the scapulæ. These changes give the patient a stooping posture. The chest does not expand, but is raised up by the scaleni and sternocleidomastoid muscles which stand out prominently and are hypertrophied. The heart's apex beat is invisible and there is usually marked epigastric pulsation. On **palpation**, vocal fremitus is found diminished, but not absent; the apex beat is rarely felt. There is distinct shock over the ensiform cartilage. This is due to the displacement of the heart and engorgement of the right ventricle. There is marked pulsation in the epigastrium. On **percussion** there is sometimes increased resonance, almost amounting to tympany. The upper level of hepatic dullness is depressed. The heart dullness may be obliterated and the upper limit of splenic dullness may also be lowered. The **percussion** note is greatly extended. **Auscultation** reveals that the inspiration is short and feeble while there is prolonged expiration, the normal ratio being reversed. In associated bronchitis rales are frequently heard.

Diagnosis.—Unless complicated the diagnosis is generally easily made. The enlargement of the thorax, with dyspnea and hyper-resonance and a prolonged expiration will differentiate emphysema from **chronic bronchitis**. **Pneumothorax** is of sudden development while emphysema is of slow development. Pneumothorax is usually unilateral, and it gives a tympanitic percussion note. In auscultation there is amphoric breathing and metallic tinkling and absence of any vesicular murmur.

Prognosis.—The disease is rarely fatal, although death may result from heart failure, dropsy or pneumonia. Thorough and persistent treatment will generally relieve the primary condition. The disease, as a rule, runs a long course but does not necessarily shorten life.

Atrophic emphysema is a senile change.

Treatment.—In cases of recent occurrence one may be able to build up the altered lung tissue by treatment of the innervation to the lung structure, viz.: the vasomotor nerves from the second to the seventh dorsal, the vagi, and the cervical and dorsal sympathetics. When a number of air vesicles have been converted into one sac, it is impossible to restore the altered lung structure and a treatment to relieve the symptoms and to prevent the further progress of the disease is indicated. In all cases treatment should be applied to correct any vertebræ or ribs of the upper dorsal region that may be displaced, and to raise and spread the ribs so that the lung structure may be better nourished and strengthened and that the aeration of the blood will be more perfect. Treatment of the vagi nerves is important, as their physiological action on the lungs is to increase their movement.

The general health of the patient is an important consideration and everything should be done to promote as healthy a condition as possible. The digestion should be carefully looked after and everything done to restore a normal state of the blood. A change of climate may prove beneficial.

Strengthening the cardiac action will be of service in relieving any dropsical tendency that might occur on account of obstruction to the pulmonary circulation. If bronchitis or asthma occurs, their respective treatments are indicated. A general treatment of the splanchnic and lung vascular areas should be given to prevent any disturbance in the circulation which might cause congestion of the liver, congestion of the hemorrhoidal veins, or catarrh of the stomach and bowels.

“Free evacuation of the bowels and measures to relieve any flatulent distention are very needful in cases of emphysema to take off from the diaphragm any pressure from below, and to allow it to descend as freely as possible. With this view also the food should be concentrated, nourishing, and not bulky.”¹

It is a good plan to instruct the nurse or attendant to aid inspiration by raising the arms strongly above the head during inspiration and to compress the chest during expiration so as to coincide with natural breathing, which will render the aeration of the blood greater and increase the elasticity of the vesicles.

1. Yeo—A Manual of Medical Treatment or Clinical Therapeutics, Vol. 1, p. 597.

Acute Lobar Pneumonia**(CROUPOUS PNEUMONIA)**

This is an acute, infectious disease wherein various vertebral, rib and muscular lesions predispose to a lowered nutritive state of the parenchyma of the lung, permitting the invasion of the diplococcus pneumoniae, with consequent local inflammation and pronounced constitutional disturbances, chill, extreme prostration and fever, which terminates abruptly by crisis. Secondary infective processes are frequent.

In describing a typical case of pneumonia it is considered as a self-limiting disease. By osteopathic treatment it is often aborted or, at least, its course much shortened. In such a case it is not typical pneumonia and could not be described as such.

Osteopathic Etiology and Pathology.—Pneumonia occurs more often in the young up to the sixth year and in the aged. It is more frequent during the winter and spring months. "Colds," exposure and wetting are predisposing influences that lower resistance. Climate exerts little predisposing influence. Males are, on the whole, more frequently attacked. Pneumonia may follow injuries of the chest. Various derangements of the ribs and vertebræ are always found in pneumonia; such derangements correspond with the regions of vasomotor, motor and trophic fibers of the lungs, viz., second to seventh dorsal, inclusive, and the upper cervical vertebræ, the latter region affecting the vagi. The muscles of the chest region are always severely contracted. These various disorders produce a lowered vitality of the bronchial and lung tissues, thus favoring the existence of the micrococcus lanceolatus. Unhygienic surroundings, alcoholism, any or all habits that tend to depress the nervous system, or lowered vitality from some pre-existent disease, like diabetes, Bright's disease, organic heart affection or one of the infectious fevers, favor its development. One attack undoubtedly predisposes to another and repeated attacks may occur in the same individual. The exciting cause is the invasion of the lung by pathogenic bacteria, especially by diplococcus pneumoniae. Pneumococci are frequently found in the throat and mouth of the healthy.

Pathologically, the lung in croupous pneumonia exhibits three distinct stages—congestion, red hepatization and gray hepatization. In the **stage of engorgement** the tissue is red in color, firm and solid and less crepitant than the healthy lung. The cut surface is bathed in blood and stained serum. Microscopic examination shows the capillaries to be dilated and tortuous. The alveolar epithelium is swollen and the

air cells filled with a variable number of red corpuscles, detached alveolar cells and a few leucocytes. During the **stage of red hepatization** the tissue is solid. It is reddish brown in color and of a dry, mottled appearance. It is very friable and does not crepitate, as the affected portion is airless. Its weight and specific gravity are increased so that it sinks in water. The torn surface presents a granular appearance, there being fibrinous plugs in the air cells. On microscopic examination the air spaces are found filled with coagulated fibrin. The tissue contains red blood corpuscles and pus cells and the walls of the air cells are infiltrated. In sections properly treated the diplococcus is detected, and in some cases also the streptococcus and staphylococcus. In the **stage of gray hepatization**, the lung is still dense and heavy, but the surface is moister and softer, while the lung tissue is even more friable and the red color gives place to a mottled gray. The exudate loses its granular character and a yellowish white purulent liquid flows from a cut surface. Microscopically, the air cells are filled with leucocytes, while the red corpuscles and fibrin filaments have disappeared. The stage of gray hepatization is the stage of beginning **resolution**. The exudate is softened. The cell elements are disintegrated and absorbed by the lymphatics and largely eliminated through the kidneys. In unfavorable cases the consolidated lung may become infiltrated with pus, and abscesses occur. In some instances the tissue is gangrenous, or it may become the seat of fibroid induration. These, however, are rare.

Symptoms.—The disease begins abruptly, usually with a severe chill, lasting from half an hour to an hour, the fever rising rapidly. There is a sharp pain in the side, the skin becomes harsh and dry, the face is flushed, the eyes are bright and the expression anxious. A short, dry, painful cough soon develops. The expectoration presents a characteristic, rusty or blood tinged appearance and is extremely tenacious. The temperature rises rapidly, frequently to 104 or 105 degrees F., and continues high for from five to ten days and generally terminates by crisis. The pulse is full, but the pulse-respiration ratio is not maintained. There is marked dyspnea, the respirations ranging from forty to fifty per minute. There are many fine rales. Headache, gastro-intestinal disturbances, sleeplessness, epistaxis, rarely delirium except in drunkards, may also be present.

The symptoms given are those of a typical case of pneumonia, but all are subject to modification. The onset may be gradual and the chill absent. In all cases, and especially drunkards, the temperature may not be high, while the pulse is often feeble and rapid instead of full and

strong, and the physical signs may not make their appearance until the second or third day.

Special Symptoms.—The **fever** rises abruptly in the initial chill, the temperature reaching 104 or 105 degrees F., and is continuous with a variation of a degree or two. The fever terminates by **crisis** after having continued from five to nine days. The temperature commonly falls during the night and is accompanied by a profuse perspiration. The temperature may fall from five to eight degrees in eight to twelve hours. There is a wide range here depending upon promptness and skillfulness of treatment, the reaction of the tissues, and previous health. Early treatment is invaluable in modifying the course of the disease.

The **sputum** at first is mucoid and frothy. About the second day it becomes of a characteristic color, quite copious and consisting of a frothy, fluid mucus, containing small viscid masses. It is very viscid and glutinous, in some cases almost from the onset. In old and previously weak persons, there may be no expectoration. Under the microscope the sputum is seen to contain red blood-corpuscles, leucocytes, alveolar epithelium, the micrococcus lanceolatus as well as other micro-organisms, pus corpuscles and small fibrinous casts. A stabbing **pain** is a common early symptom, as well as a dry, short **cough**. The **urine** is febrile, scanty and high-colored. Urea and uric acid are increased. A trace of albumin is often present, and there may be symptoms of acute nephritis. **Herpes** is common. The naso-labial herpes appear from the second to the fifth day, and they may occur upon the cheek, genitals and also upon mucosa of the tongue. It is supposed to indicate a favorable prognosis. There is redness of the cheek, usually on the affected side. The mucous membrane of the mouth is dry. The tongue is white and furred. Anorexia and thirst are present. The patient is usually constipated, but diarrhea may occur. Vomiting is common. The spleen is usually enlarged, but the liver is not perceptibly increased in size, unless there is extreme engorgement of the right heart. The **pulse** is bounding. The average pulse-rate is from 100 to 108 per minute. In consolidation the left ventricle receives a lessened amount of blood and the pulse may become small. In the aged and debilitated, a small, weak and rapid pulse may be present. The **heart sounds** are loud and clear, and in favorable cases the pulmonary second sound is accentuated, owing to the increased tension in the pulmonary vessels. Upon distension of the right side of the heart and partial failure of the right ventricle, the second sound becomes less distinct which is a very unfavorable symptom, for very much depends upon the strength of the right

ventricle in pneumonia. The **blood** usually exhibits leucocytosis which disappears with the crisis. In malignant pneumonia this is absent and its continued absence is an unfavorable sign. The proportion of fibrin is also greatly increased. The diplococci can rarely be seen. Headache is common as an initial symptom and may be persistent. The disease is often ushered in by convulsions, especially in children; consciousness is usually retained throughout the whole attack, even in severe cases, though in some cases there is delirium. In drunkards delirium tremens may be present from the onset. In these cases the patient often wanders about until the preliminary excitement gives way to coma.

Physical Signs.—Stage of Congestion.—Diminished expansion, the movements of the affected side are defective, the face is flushed and the patient lies on the affected side. Tactile fremitus is slightly increased. There may be tympany over the involved area from diminished intrapulmonary tension. In the latter part of this stage there is impairment of resonance. Fine crepitant rales are heard at the end of forced inspiration. Great care has to be taken in examination when there is deep seated consolidation.

Stage of Red Hepatization.—The breathing is markedly abnormal. Very little or no expansive motion of the chest over the affected region. Vocal fremitus is markedly exaggerated. The skin is hot and dry and the pulse frequent. Dullness over the affected parts with an increased sense of resistance is present. There is high-pitched, prolonged, bronchial breathing when the lung becomes solidified. When the larger bronchi are completely filled with exudate, tubular breathing is absent. Crepitant rales may also be heard.

Stage of Gray Hepatization.—Largely the same physical signs are repeated in this stage as in the second. The normal manner of breathing returns, as does also the normal expansive movement of the affected side. Crepitant rales reappear. The temperature of the skin is lessened, breathing changes from bronchial to vesicular and bronchial resonance continues for some time.

Complications.—Pleurisy is the most frequent complication. Pneumonia on one side and pleurisy on the other is possible. The pain is more acute and localized. The respiration is greatly affected and the usual signs of effusion are present. Empyema may be a complication. **Pericarditis** is more common in the pneumonia of children. Though usually plastic it may be sero-fibrinous, but rarely the fluid is purulent. There is increased dyspnea, the pulse becomes weaker, and the heart

sounds are gradually suppressed. **Endocarditis** is a comparatively frequent complication. It is more liable to attack patients with old valvular disease and to affect the left heart. The physical signs are sometimes absent and even when present are liable to be very deceptive. It may, however, be suspected in cases where the fever is protracted; when septic manifestations, such as chills, sweats or irregular temperature, develop; when embolic symptoms appear, or when a rough, diastolic murmur develops. **Meningitis** is a complication that comes on at the height of the fever. This complication is rarely recognized unless the basilar meninges are involved. It is frequently associated with ulcerated endocarditis. Cerebral embolism causing hemiplegia has been observed. Other possible complications are neuritis, arthritis, nephritis, parotitis and various digestive disorders.

Diagnosis.—A typical case of pneumonia is easily recognized. The abrupt onset with rigor, the rapidly developed fever, the sputum, physical signs and abnormal pulse-respiration ratio, as a rule make the diagnosis easy. Frequent examination of the lungs should be made in Bright's disease, diabetes, organic affections of the heart, cancer and alcoholism, as all these affections are liable to become complicated with acute pneumonia. **Pleurisy** is often confounded with pneumonia. The resemblance between friction sounds and crepitant rales is often very close. In pleurisy vocal resonance and vocal fremitus are diminished; there is no "rusty" sputum; the percussion dullness may change with the posture of the patient, and the breathing is distant and weak. A typhoid state may be mistaken for typhoid fever. Hypostasis occurs late in typhoid fever while dullness sets in early in pneumonia. The history of the onset will be of aid, as pneumonia as a complication sets in late in the disease. The Widal test will be of value. **Acute phthisis** may begin with a chill and may resemble pneumonia very closely, especially the physical signs. Examination of the sputum will show the bacilli of tuberculosis. The X-ray will often be of aid as a diagnostic measure.

Prognosis.—This largely depends upon the previous health of the patient. At the extremes of life the prognosis is much more unfavorable. It is especially fatal in drunkards. By competent osteopathic treatment the mortality rate may be materially lessened and this disease, dreaded by both physician and patient, need not seem so fearful. The death rate from pneumonia during the past few years has been appalling. In New York and Chicago nearly one-eighth of the deaths the year around are due to pneumonia, and during certain months of the year twenty-sev-

en or eight per cent. of all deaths are due to this disease. Drug medication is notoriously unreliable, the most competent physicians freely admitting that they are practically powerless to stay the ravages. Given a patient with a fair constitution, osteopathic treatment will offer reasonable hope to the sufferer. There is no question that osteopathy merits much commendation in the treatment of pneumonia. Many severe cases have been cured and many more have undoubtedly been aborted. The treatment is directly applicable and specifically indicated, and coupled with good nursing and hygiene, the mortality rate of the old schools is being markedly lessened.

Treatment.—The treatment of pneumonia must be both constitutional and local. By this is meant that the systemic strength and vigor must be maintained in addition to treatment of the chief lesion of the disease, which is located in the lungs.

During the various stages of the disease, the treatment should be directed to the nerves of direct innervation that control the capillaries, and to the vasomotor nerves of the pulmonary circulation, in order that the hyperemic and inflamed state of the pulmonary capillaries and adjacent tissues may be lessened and the circulatory system equalized. The disordered tissues that should be corrected in order that the centers of the spinal cord and the nerves that influence the function and structure of the lungs may be relieved, are: contraction of the thoracic and dorsal muscles, subluxations of the ribs and dorsal vertebræ from the second to the seventh, inclusive, and the upper cervical vertebræ that may become disordered and impinge upon the vagi nerves. However, owing to the fact that the vasomotors are not especially abundant here, all increased chest mobility and deep breathing and abdominal aid will materially assist the circulation. Also, carefully treat the middle and inferior cervical regions for the lymphatics of the lungs. Each of these regions should be carefully examined and thoroughly treated whenever found involved. The specific micro-organisms that influence the course of pneumonia are naturally very important factors; but observing and improving the general health, and establishing an unobstructed circulation through the diseased lung tissues will hasten the crisis by favoring a rapid formation of antidotal substances to neutralize the poisonous substance produced by the micrococcus lanceolatus. Healthy tissues, which occur only where there is uninterrupted freedom of vascular supply and nerve force, are obtained by correction of any and all anatomical disorders. This will rapidly decrease any lethal tendency in the patient and often abort the disorder so that all that is needed is sufficient time for

nature to heal the diseased tissues. The principal predisposing cause of many specific diseases, is some disorder of the anatomical tissues that interferes with normal physiological functions; and the determining of the different types of disease is often due to the location of the lesion and the character of the micro-organism involved in each disease. What is necessary in many cases is a correction of the mechanical predisposing condition and the exciting and determining influences will be rendered inactive.

The importance of close attention to both vagi can not be overestimated. Any obstruction above or below the origin of the superior laryngeal nerve is followed by loss of motor power of the lungs, thus causing difficult and labored breathing. The lungs become surcharged with blood, because the air pressure in the lungs is low and the thorax is distended. This condition is followed by serous exudation. Thus obstruction of the vagi may be one factor in the cause of pneumonia. Obstruction of the vagi below the origin of the recurrent laryngeal nerves affects the lower and middle lobes of the lungs, and produces also a catarrhal inflammation of the upper lobes. The recurrent laryngeal nerves may be obstructed by dilatation of the aorta or subclavian artery as they wind about them; also by dislocations of the first and second ribs, which may affect the nerves not only directly, but by causing an obstruction to the subclavian vessels with a consequent disturbance of the aorta and the heart. The recurrent laryngeal nerves may be treated directly at the inner lower part of the sternomastoid.

One of the chief objects of the treatment should be to prevent **heart failure** and to lessen the pulse-respiration ratio. The average pulse-rate in typical cases is from 100 to 110 per minute and when it exceeds this to any extent, say 120, there is cause for alarm. At first the pulse is full and bounding, later it is small on account of a lessened amount of blood reaching the left ventricle and systemic circulation, owing to the extensive consolidation. In treating heart failure particular attention should be paid to the condition of the ribs on the left side over the region of the heart, the second to the fifth, inclusive. A correction of any disturbance to the inhibitory nerves of the heart, (the vagi) and the accelerator fibers of the heart (the cervical sympathetic) should be made. This means close attention to probable derangements of the vertebræ from atlas to first dorsal. General treatment of the entire system will relieve the heart of some work and favor an equalization of the vascular system. Also by the use of hydrotherapy the maintenance of the heart's action may be accomplished. Cold compresses, and not warm ones,

should be used, as the latter relax the vessel walls, producing more or less paresis of the vessels, while the former stimulate the vaso-dilators, producing dilatation and tone of the vessels, thereby causing a vigorous increase in the flow of blood. This relieves the heart by increasing the cutaneous circulation, besides increasing arterial tension. The right heart is indirectly aided by the increase of the tension in the general vascular system, and the vessels of the pulmonary circulation have more force expended upon them and a greater contraction of their vessels occurs on account of the dilatation of the cutaneous vessels. The temperature of the water used should be 60 degrees F., and the compress applied for thirty minutes or as long as necessary.

Attention to the abdominal area and diaphragm will have a definite effect upon the circulation and elimination. It is beneficial in its influence upon lungs and heart and in combatting toxemia. Carefully graduated deep breathing is of distinct benefit.

In addition to the fever treatment in the cervical and dorsal regions, the gradually cooled tub-bath will be of aid. The temperature at first should be ninety degrees F. and then gradually cooled to eighty degrees F. The duration should not be over ten or fifteen minutes. Care should be taken that the patient does not exert himself. He should be lifted in and out of the baths. These baths also have a marked effect upon the respiratory and nervous centers. The ice-bag over the chest and spine has a beneficial influence; still, with feeble children be exceedingly careful when applying or using cold methods.

During all stages of the disease, the best possible care should be taken of the patient. See the patient frequently, probably twice a day or oftener. Each time thoroughly relax the dorsal muscles and re-adjust the ribs, for as every osteopath of experience will note (and Dr. Still particularly emphasizes) the contracted muscles frequently and continually displace the ribs. The treatment should not be prolonged to a point of overfatigue, but a definite reaction of tissues should be secured but no further.

Carefully raise all the ribs and moderately hyperextend the spine. Release the cervical, pectoral and axillary lymphatics, and stimulate spleen and liver.

Experience has shown that the first treatment is of the greatest importance and if the osteopath will control the predominant symptoms at that time the result will be much simplified. For that reason it is best not to leave the patient until the chest pain, fever, high pulse or whatever may be present, are well in hand, although it may mean a long visit

with fairly frequent treatments. Treat the conditions existing and wait; then treat again and the result will more than repay. There is always more than a chance of aborting the disease, but the first treatment is often the crucial test. F. E. Moore and many others report numerous cases treated without a fatality and the average duration of the disease not exceeding five days. The apartment should be well aired and a temperature of 65 degrees F. maintained. In the very young the temperature should be higher. The diet is exceedingly important. Give a liquid, light and nutritious one, a milk diet being preferable. Otherwise give meat juice, broths, egg albumin and whey. Avoid starchy and saccharine foods, and give plenty of water. Good nursing and complete rest of body and mind, with careful attention to the activity of the bowels, kidneys and skin, will indirectly aid the clogged up lung fascia to perform its function and hasten an early recovery from the disease. In epidemic forms be particularly vigilant in the employment of antiseptics.

Bronchopneumonia

(CATARRHAL PNEUMONIA)

Definition.—An inflammation of the minute bronchi and air vesicles. The affection begins with an inflammation of the capillary bronchi, which extends to the air vesicles. The micrococcus lanceolatus, streptococcus pyogenes, influenza bacillus, and staphylococcus aureus et albus are the principal exciting microorganisms.

Osteopathic Etiology and Pathology.—The disease is most prevalent among the very young and the old, and may be either primary or secondary. It may occur as a sequence or in association with measles, diphtheria, whooping cough and scarlet fever. Exposure to cold, impure air, rickets and diarrhea are marked predisposing causes in children. In the old, debilitating affections and chronic diseases are predisposing causes. Bronchopneumonia occurs sometimes as a complication in smallpox, erysipelas, typhoid fever and influenza. The principal lesions found upon examination are subdislocated ribs affecting the pulmonary vasomotor nerves. The third, fourth and fifth ribs are especially apt to be subdislocated. The muscles throughout the thoracic region are generally severely contracted.

Another group of cases, the so-called **aspiration or deglutition pneumonia**, are caused by the inhalation of food particles or other substances. A lessened sensitiveness of the larynx (as in comatose states) may allow small particles of food to reach the smaller bronchi

and produce inflammation, which may even cause suppuration and sometimes gangrene. Cases are liable to occur after operations about the nose and mouth. It is often secondary to carcinoma of the larynx and esophagus and after tracheotomy and glosso-pharyngeal palsy. A serious form of bronchopneumonia is caused by the **tubercle bacillus**.

Pathologically, both lungs are usually involved and become heavy. On the pleural surfaces, especially at the base, sunken purplish or slaty patches are noticed, representing collapsed lung tissue. On section small, projecting portions of consolidation are seen, separated from each other by uninflamed and collapsed tissue. The section of lung tissue is of a dark reddish color. The terminal bronchi are filled with tenacious, purulent material. Microscopically, the terminal bronchi and air cells are filled with a plug of exudation composed of leucocytes and desquamated epithelium. The walls of the bronchi are swollen and contain many leucocytes.

Symptoms.—The symptoms are frequently marked by those of the primary affection. The onset may be either abrupt or gradual. The child becomes feverish; there is increased frequency in respiration and there is an aggravated cough. The temperature rises to 102 or 104 degrees F.; respiration may rise as high as 60 or 80. The cough is hard, distressing, frequently painful and accompanied by a mucopurulent expectoration. The pulse is greatly accelerated—120 to 180 per minute. As the disease advances, signs of deficient aeration of the blood are noticed. At first there is a pale and anxious expression of the face, the lips are blue and the child makes strenuous efforts to breathe. The blood soon becomes highly charged with carbon dioxide and, by its benumbing influence upon the nerve centers, sensibility is reduced and the cough and suffering subside. The face becomes livid and death may occur within twenty-four hours from paralysis of the heart.

At the beginning of the attack dullness is absent and subcrepitant and sibilant rales are present. Areas of consolidation soon become manifested. There is slight impairment of resonance and the breathing is harsh. Upon inspection there is, in grave cases, retraction of the sternum due to defective expansion.

Diagnosis.—This is usually easy, developing as it generally does in the course or at the conclusion of another disease, with a gradual onset as a rule, and irregular fever and a long duration, besides usually occurring in children under five. If the areas of consolidation are large, involving the greater part of a lobe, it is sometimes very difficult to distinguish bronchial pneumonia from lobar pneumonia. **Lobar pneumonia**,

when occurring in children, is usually between the ages of five and fifteen. The onset is abrupt in a child of good health; it resolves rapidly; there is rusty colored sputum and continued fever falling by crisis. **Tuberculous bronchopneumonia** is very hard to differentiate from simple bronchopneumonia. A great many cases can be correctly diagnosed only after the lapse of considerable time. The presence of signs of softening, considerable disease of the apices, and examination of the sputum, or in the case of a child, of the vomited matter, would diagnose this form. If elastic fibers and tubercle bacilli are found in the sputum or vomited matter, the diagnosis is at once decided in favor of tuberculous bronchopneumonia. X-ray diagnosis should be considered.

Prognosis.—The prognosis depends on the cause. In children that are previously weak and debilitated the disease is very fatal. When the disease follows measles and whooping cough, the fatality is not so great. In adults the prognosis is about the same as in the croupous form. The deglutition variety is apt to be fatal.

Treatment.—A great deal can be done to prevent the disease, by careful attention to debilitated children in keeping them warm and protected at all times. There is usually a preexisting bronchitis. In measles and whooping cough and during convalescence, the child should be well taken care of.

A thorough, persistent treatment, but not to a point of overfatigue, of the dorsal vasomotor nerves posteriorly should be given. Gentle work over the cervical and axillary lymphatics to free the edematous barrier, correction of the tensed scaleni and deranged first ribs and clavicles, and stimulation of spleen and liver, with sufficient general treatment to start reaction, will be effective. Derangements to the third, fourth and fifth dorsal nerves are most likely to be found; the principal vasomotor innervation to the bronchials and air vesicles is from this region. Treatment over the chest anteriorly is of great aid, especially an upward and outward manipulation to release the ribs should be given. Attention should be given the vagi nerves to increase the activity of the lungs as well as for the effect gained upon the circular fibers of the bronchi. Care should be taken, that the first rib is not impinging upon the first thoracic ganglion, or interfering with lymphatic drainage.

Ice-bags over the chest are helpful. The chest should be protected from changes in temperature by a jacket of cotton batting. The diet should consist of milk, egg albumin and broths. Keep the temperature at about 70 degrees F. and the air of the room moist and free from draughts. When the fever is high, sponging or the wet pack is helpful.

The bowels from the beginning of the attack should be carefully watched.

There is danger of a **falling heart**; this is generally associated with mucous rales and cyanosis. Douching alternately with hot and cold water will usually excite coughing and overcome the difficulty. The gradually cooled bath will have a marked effect in reducing the temperature, quieting the nervous symptoms, increasing the respiratory power and promoting sleep.

Raise and carefully stimulate the abdominal viscera, and elevate the diaphragm. This is effective in both cyanosis and toxemia.

In the first stage of pneumonia, Hazzard¹ says, "There is better opportunity to correct the specific lesion, as the patient's strength will allow of such treatment. The work is also aided by the fact that the alveoli are still open, and lung action, stimulated by treatment, may become a valuable aid in dispelling the engorgement." This is a most valuable suggestion, but be exceedingly careful in subsequent treatments not to treat too hard and thus lame and bruise the patient.

Series I, II, III, and V of the American Osteopathic Association Case Reports present several interesting cases of pneumonia which typify the importance of immediate and direct correction of the osteopathic lesions.

Herman² cites an interesting case of delayed resolution, due to a depressed condition of all the ribs on the affected side with marked luxation of the eighth. The lesion at the eighth was the cause of a prolonged attack of hiccoughs which prevented resolution. It is pointed out that there is an abundant intercostal nerve supply to the diaphragm from the eighth and ninth intercostals. C. E. Achorn instances an autopsy of patient dying of pneumonia, where a bony ankylosis was found at the second dorsal; this lesion was probably an important predisposing factor.

Broadly speaking, one should keep in mind the following: First, early treatment will frequently abort what would ultimately be pneumonia—still, in the preceding it is not these cases that are especially referred to, but those following the course of a typical pneumonic process; second, both specific and general treatment prior to the crisis will materially lessen the severity of the disease; third, the crisis corresponds to beginning resolution (during resolution expectoration and liquefaction and absorption of the exudate are paramount features) and must be met promptly and vigorously, special attention being paid to the heart; and,

1. Hazzard—Practice of Osteopathy p. 91.

2. Herman—An Unusual Feature in a Case of Pneumonia—Journal of the American Osteopathic Association, July 1906. (This refers to lobar pneumonia.)

fourth, during convalescence, good, general attention and care of patient as to treatment, hygiene, diet, and climate, are important.

Chronic Interstitial Pneumonia

(FIBROID INDURATION)

Definition.—A chronic, inflammatory disease of the lungs, characterized by an overgrowth of fibrous or connective tissue.

Etiology.—With few exceptions chronic affections of the lungs cause more or less fibroid overgrowth. This is especially frequent after bronchial pneumonia and pulmonary tuberculosis. It is also excited by abscesses, hydatids, syphilis, emphysema, sarcoma and old fibrinous pleurisy. It may also be caused by compression, by aneurism or neoplasms. It may arise as a primary affection, due to the inhalation of irritating dusts (stone dust, coal dust and metal dust). There will be found deeply seated osseous lesions of the upper and middle dorsal region and corresponding ribs, and frequently of the cervical vertebræ.

Pathologically, as it involves limited or extensive areas, it is recognized as **local** or **diffuse**. It is a unilateral affection. The involved portion is shrunken and on section it is found to be tough, firm, of a greenish color and containing an overgrowth of fibrous tissue. If it affects the left side the heart may be displaced. The unaffected lung is usually enlarged (compensatory emphysema). There is hypertrophy of the right ventricle of the heart.

Symptoms.—There is a chronic cough, which varies greatly in its severity; moderate dyspnea, and a variable expectoration. There is no fever and the general health of the patient may be preserved for a number of years. The expectoration is generally copious, muco- or sero-purulent, rarely fetid. There is retraction of the affected side, displacement of the apex beat and lateral curvature of the spinal column. The unaffected side is enlarged. The intercostal spaces disappear, the ribs sometimes even overlapping. The tactile fremitus is generally increased, but if the pleural membrane is thickened the fremitus may be decreased. There is generally impairment of resonance. A tympanitic or amphoric note may be heard over a dilated bronchus. On the sound side the percussion note is generally hyper-resonant. The breathing sounds may be feeble. They may be bronchial or cavernous, but rather amphoric. Late in the disease cardiac murmurs are not uncommon.

Diagnosis.—This is never difficult. It is mainly to be distinguished from **fibroid phthisis**. In the latter both lungs are involved and there

is fever and bacilli are found in the sputum. An X-ray examination should be made.

Prognosis.—The disease is exceedingly chronic and may last for many years. Death may result from gradual failure of the right heart, hemorrhage or from intercurrent attacks of acute pneumonia involving the other lung.

Treatment.—Little can be done for this condition. Intercurrent bronchitis may be somewhat relieved by the treatment for chronic bronchitis. The patient should dwell in a mild climate. Hygienic surroundings and nutritious food are indicated. Something can be done by attempting to correct the condition of the ribs and vertebræ, but this measure, from the nature of the disease, is generally palliative at best.

Congestion of the Lungs

Congestion of the lungs may be active, passive or hypostatic. The two former have particular osteopathic significance, owing to the lesions involved.

Active congestion may result from violent physical exertion, excessive alcoholic indulgence, inhalation of hot air or as a symptom in pneumonia and other pulmonary affections. There is dyspnea and cough with rusty expectoration of a frothy nature. There may be absence of fever. But generally a slight chill followed by moderate fever, pain in side, and cough are the principal symptoms. On percussion, the note is dull with increased tactile fremitus and bilateral involvement.

Prognosis is good under osteopathic treatment, but it must be promptly met as it is usually a symptom of another disease.

Treatment is the same as in the beginning of pneumonia.

Passive congestion, when not hypostatic, is mechanical and due to an impeded return of blood to the left heart from mitral stenosis, or regurgitation, dilatation of the right ventricle and cerebral disease. The lungs are large with distended pulmonary vessels with venous blood in the air spaces. There is dyspnea and cough, with blood-streaked, frothy expectorations.

The **treatment** is primarily of the condition causing the congestion, but in addition the upper ribs should be raised and thorough treatment of the abdomen and elevating the diaphragm are beneficial.

Hypostatic congestion results from a weakened heart in exhaustion, infection or old age; also from continued dorsal decubitus. Rheumatic fever, tuberculosis and other constitutional diseases, as well as organic growths, may predispose. The condition gives rise to a mild form

of lobar pneumonia. **Symptoms** are not well defined and often are not recognized. There may be slight dullness, increased fremitus, moist rales and other signs of a venous engorgement.

In **treatment** the first move is to change position of the patient and then look after any underlying cause. Osteopathically, follow treatment of pneumonia. In all cases of circulatory involvement of the lungs, treatment to relax muscles or to adjust vertebræ and rib lesions to the vasomotor nerves of the lungs is very efficacious. Landois (1904) says: "Irritation of sensory nerves, particularly if intense and long continued, causes a dilatation of the vessels in the areas innervated by them."

Edema of the Lungs

There are two forms of **edema**, collateral and general, which follow an intense congestion with transudation of serum into the air vesicles and interstitial tissue. The **collateral form** is localized and usually appears in connection with pneumonia, pulmonary infarction or abscess. In **general edema** the base of the lung is involved to a greater extent, but the whole structure is affected and hydrothorax is generally present. The **cause** of edema is not well understood, but may result from a long line of constitutional diseases. The **symptoms** are dyspnea, cough with copious, blood-streaked sputum which is expelled with difficulty. There may be fever in the inflammatory type with weak, increased pulse. Dullness over the affected area, bronchovesicular breathing and small liquid rales are audible. The **diagnosis** must largely be made upon the bilateral dullness at the base of each lung and physical signs noted above. X-ray examination will usually be of value. **Prognosis** depends on the condition causing the edema and treatment should be directed to correcting it. Frequently edema is a terminal affection. This should be followed by osteopathic treatment to free the lungs of the effusion as outlined under pneumonia, especially relaxation of the upper dorsal and cervical muscles, separation of the upper ribs and stimulation of the heart.

DISEASES OF THE PLEURA

Pleurisy

Definition.—An inflammation of one or both pleural membranes.

Varieties.—Etiologically, it may be divided into primary and secondary pleurisy; also, into acute and chronic pleurisy. Anatomically, the cases may be divided into dry pleurisy and pleurisy with effusion (sero-fibrinous, purulent, hemorrhagic).

Acute Pleurisy

(FIBRINOUS OR PLASTIC PLEURISY)

The affection may be primary or secondary. As an independent affection it is rare. It may follow exposure to wet and cold or it may be due to mechanical injury. The disease may set in with pain in the side, slight fever and the friction sound of pleurisy may be present. These symptoms last a few days and then disappear and no exudation occurs. The pleural surfaces become more or less united.

As a secondary process, dry **plastic pleurisy** arises from extension of the inflammation in acute or chronic diseases of the lung, especially pneumonia. Abscesses, gangrene and cancers are also causes. It sometimes occurs in acute articular rheumatism, and in a large number of cases is associated with **tuberculosis**. This condition may be a complication in chronic Bright's disease and in chronic alcoholism.

In the **fibrinous form of pleurisy** the serum is scant and the membrane is covered with a sheathing of lymph, which finally organizes and adhesion takes place between the opposing surfaces.

Serofibrinous Pleurisy

This form is known as pleurisy with effusion. There is little lymph, the exudate being mainly composed of serum.

Osteopathic Etiology and Pathology.—Many cases rapidly follow exposure to cold, wet or an injury to the thorax. Exposure to cold is considered a mere predisposing agent, permitting the action of various micro-organisms. The large majority of cases are due to **tuberculous** infection of the pleura.

The osteopath finds that important predisposing causes of pleurisy are injury to the chest wall, ribs and vertebræ, and exposure to cold, causing contraction of the thoracic muscles. These injuries and strains throughout the chest result in an interference with the intercostal and phrenic nerves, and also with the intercostal and internal mammary arteries; consequently, there is produced a lowered vitality of the pleural tissues, which permits the attack of the micro-organisms. It may be secondary to rheumatism, Bright's disease, cancer and cirrhosis of the liver.

Pathologically, there is an abundant exudation of serum. Fibrin is found on the pleura, and is rarely abundant in the serous fluid in the form of flocculi. The fluid is straw colored as a rule. It varies greatly in quantity from one-half to four litres. Microscopically, there are

found leucocytes, red blood-corpuscles, shreds of fibrin and occasionally cholesterin, uric acid and sugar. The composition of the fluid resembles blood serum, and is rich in albumin.

Various displacements of the adjacent organs are caused by the effusion. The lung is more or less compressed into the back part of the pleural sac. The heart is displaced. The diaphragm may be crowded downward. On the right side this lowers the liver; on the left it displaces the stomach, transverse colon and sometimes the spleen.

Symptoms.—The onset may be abrupt with a chill, severe pain in the side and fever. With few exceptions the disease comes on insidiously, pain in the side being the first symptom. The pain is sharp and cutting and is aggravated by breathing or coughing. There is moderate fever, the temperature ranging from 102 to 103 degrees F. Dyspnea may be present at the onset. This is due to the fever and pleuritic pain. When the fluid is effused slowly, dyspnea may be absent except on exertion. It is most marked when the effusion has developed rapidly. As the effusion accumulates and the inflamed surfaces separate, the pain diminishes and, as a rule, soon disappears.

Physical Signs.—Immobility and bulging of the affected side, depending on the amount of exudation. The intercostal spaces are obliterated. The apex beat of the heart is displaced. Upon **palpation** the limited movement of the chest is more accurately determined. Tactile fremitus is largely diminished. The position of the heart's impulse can be readily located by palpation. Displacements of the liver and spleen can be felt through the abdominal walls. At first the **percussion** notes are impaired and later there is dullness which gradually rises as the fluid increases. The upper line of dullness is not horizontal when the patient is in the erect posture, but is higher behind than in front. Above the effusion in the sub-clavicular region, percussion gives a tympanitic note, the so-called Skoda's resonance. In moderate effusions the level of dullness often changes with the position of the patient. Early in the disease a friction rub can usually be heard. As the fluid accumulates, the breath sounds become weak, distant and may have a tubular or bronchial quality. Vocal resonance is usually lessened. There may be bronchophony, or it may manifest a nasal or metallic quality, resembling somewhat the bleating of a goat (Lænnec's egophony). X-ray examination should be made.

Duration.—The course is extremely variable. The fever is due to inflammation and may last for two or three weeks, when it may subside. The cough and pain disappear and the effusion, which is usually slight in

these cases, may be absorbed quickly. In cases where the effusion is poured out rapidly it may be absorbed just as quickly. In cases where the effusion is poured out slowly or where the effusion reaches as high as the fourth rib, recovery is usually slower. Large effusions may persist without change for months and finally the case may become subacute or chronic. This is particularly true of tuberculous cases.

Prognosis.—This depends largely upon the cause; on the whole, prognosis is favorable. Death is a rare termination of serofibrinous effusion; death may, however, occur suddenly without sufficient lesions to explain the cause. The exudate may become purulent.

Treatment of Acute Pleurisy

An early treatment and rest in bed with a liquid diet are the measures to be employed at the beginning of the attack. Pay particular attention to any primary disease and to the general health. Rarely is there any difficulty in locating certain predisposing causes of the disturbance. Then often a rib or corresponding vertebra is badly subdislocated over the seat of the disease. The sympathetic and phrenic nerves are involved through the intercostal and phrenic nerves. A careful examination of the side of the affected chest should be made, as there may be more or less obstruction of the intercostals and the internal mammary arteries from their branching of the aorta and subclavian vessels. A dislocation of the first or second rib may affect the subclavian vessels and their branches markedly; although all the upper ribs and the thoracic muscles should be examined carefully for derangements which would affect these blood-vessels and produce an exudation. Ice-bags upon the chest, as in pneumonia, may be used. Limiting the movements of the chest with a bandage or adhesive strips will give considerable relief.

When the effusion has taken place, carefully raising and spreading the ribs with attention to special points of involvement, will at times cause absorption of the fluid. The daily amount of liquid food should be greatly lessened with a view of depleting the blood serum from various tissues; thus the serum collecting in the pleura, which is a lymph space, will also be absorbed. Treatment of the bowels, kidneys and skin, so that they may be rendered active, will aid in the depletion of the blood serum.

It may be necessary in some cases to aspirate, especially if other methods fail and if the effusion is large. The points of operation are in the mid-axillary line at the sixth interspace or at the angle of the scapula at the eighth interspace. In puncturing, the needle should be held close

to the margin of the upper rib so as to avoid the intercostal artery. Withdraw the fluid slowly and if faintness is produced, desist.

Empyema should be treated surgically. Simply tapping is rarely sufficient. A free incision, as in abscess, and thorough drainage should be made. Care must be taken that the drainage tube is large enough.

"In cases of pleurisy the axilla and the inner arm may be tender and painful; this is due to the pleuritic inflammation being carried by the way of the 'nerve of Wrisburg.'

"The pleuritic pain in the costal muscles compels restricted movement of the ribs and also limits the respiratory function of the diaphragm. These painful cramps and stitches are independent of the pain arising alone from the inflamed pleural surface, and the diminution of the respiratory movements is due to a particularly contracted state of the muscles of the chest as is demonstrated by the fact that the patient can not draw a long breath; hence one may reasonably conclude that nature has so distributed nerves to the pleura as to enable that serous membrane to control the muscles which create movements of the adjacent costal surfaces and thus insure its quietude during the stages of inflammation or repair." (Ranney).

Chronic Pleurisy

Definition.—Chronic inflammation of the pleural layers. There are two forms, exudative and dry or plastic pleurisies.

Chronic Pleurisy with Effusion.—This may follow an acute serofibrinous type. Some cases develop very slowly. In most cases in children, the fluid changes to pus early in the disease. The fluid may remain for months without changing to a purulent character. In such cases the character and physical signs do not differ from those in acute serofibrinous pleurisy.

Chronic Dry Pleurisy.—These cases originate in two ways:

First, this may succeed pleural effusion when the fluid portion of the exudate is absorbed and the pleural layers are opposed. They are separated only by fibrinous elements that become organized into firm connective tissue. This process goes on at the base, principally, which, if it follows the acute form, produces but slight flattening, but if it succeeds the chronic form or empyema, the extent of retraction and flattening will be marked. Calcification may occur in these firm, fibrous membranes and occasionally little pouches of fluid are found between the false bands.

Second, a large number of cases are dry from the onset. This condition may follow directly **acute plastic pleurisy**. It may be of **tuberculous** origin or it may set in without any acute symptoms. No matter how slight the plastic exudate may be, it invariably tends to become organized, thus producing adhesion of the layers. This is undoubtedly the result when the pleurisy is primary or secondary. The adhesions are generally circumscribed. When the adhesions are of tuberculous origin they may be locally confined to one pleura or they may be bilateral. In these cases both the parietal and costal layers are thickened, and embodied in the thickened pleura are found firm fibrin masses and small tubercles.

Occasionally, vasomotor symptoms arise in chronic pleurisy, especially in cases of tuberculous origin, and are probably due to the involvement of the first thoracic ganglion. These almost invariably mean that there is a displacement of the first, second, or third rib. Unilateral flushing or sweating of the face or dilatation of the pupil are frequently noticeable.

Symptoms.—Definite symptoms are rarely present. In some cases the physical signs are quite pronounced, while, on the other hand, they may be entirely negative. In mild cases there may be slight immobility of the affected side with feeble breath sounds. In other cases there may be very full chest expansion while the breath sounds are feeble. In a large number of instances the physical signs are quite distinct. There is displacement of the viscera, retraction of the chest walls, curvature of the spinal column and dropping of the shoulders. There are feeble breathing and creaking, leathery friction sounds. Dullness is found at the base.

Treatment.—The treatment of chronic pleurisy is largely that of acute pleurisy. Gymnastic and methodical breathing exercises should be employed in helping to correct the thoracic walls. Care must be taken not to injure the chest and pleura if adhesions have formed. Surgical work may be necessary in some cases.

The vasomotor symptoms that are sometimes manifested in chronic pleurisy and are claimed to be due to involvement of the first thoracic ganglion, are an interesting feature to the osteopath. Such cases would probably present to the osteopath a marked lesion of the upper dorsal vertebræ or the second or third rib. These vasomotor symptoms are also found in pleurisy associated with tuberculosis of the apex of the lung.

The osteopath frequently treats these cases and he should be cautious about over treating or straining the chest wall. The adhesions are persistent and often there is more or less pain, so care must be exercised when attempting to structurally readjust. Do not expect to completely relieve every case, but nevertheless there are few cases but that can be benefited. Occasionally the pain alone is due simply to pleurodynia.

DISEASES OF THE URINARY SYSTEM

Diseases of the Kidneys

(RENAL HYPEREMIA)

Definition.—An increase in the amount of blood to the vessels of the kidney. It is active hyperemia when there is arterial congestion, passive hyperemia when there is venous congestion.

Osteopathic Etiology and Pathology.—Active hyperemia may be caused by injuries to the renal splanchnics, especially the tenth to twelfth dorsal segments; injuries over and to the kidneys; exposure to cold when the body is very warm; poison given, as diuretics; eruptive fevers and pregnancy, or follow genito-urinary operations. Passive hyperemia may be caused by obstructive diseases of the general circulation, as chronic heart, lung and liver diseases, or by pressure on the renal veins by tumors, growths and the pregnant uterus. Thrombosis of the renal veins may produce passive hyperemia, but rarely.

Pathologically, in active hyperemia the kidney is swollen and slightly enlarged. Upon removal of the capsule, the kidney is found to be brown and mottled. On section the parts bleed freely, the Malpighian bodies are distended, and microscopical examination shows a cloudy swelling of the renal epithelium. In passive hyperemia the kidney is swollen, hard, firm and of a bluish red color. Later there is an overgrowth of connective tissue and some infiltration between the tubules. The Malpighian bodies occasionally become shriveled and the renal epithelium fatty.

Symptoms.—In **active hyperemia** the urine is scanty, of high specific gravity and of high color, containing some albumin and casts. Pain is experienced over the loins, following the course of the ureters, and the bladder is irritable. There are headache, nausea and vomiting. When from infection, fever may be present.

In **passive hyperemia** the symptoms are primarily those caused by the disease producing the disorder. There is weight over the loins and dropsy. The urine is diminished, of high specific gravity, highly colored, albuminous and occasionally shows a few hyaline casts.

Prognosis.—Active hyperemia.—Usually favorable if it can be treated in time. If prolonged, acute nephritis may develop. **Passive hyperemia.**—Depends on the cause. If the disease is prolonged, it terminates in interstitial nephritis.

Treatment.—Active hyperemia.—Absolute rest and thorough treatment to the renal splanchnics and treatment over the abdomen to the kidneys directly by carefully raising them. Adjust the lower ribs if found lesioned. Water should be drunk liberally and the patient encouraged to use vapor baths. Favorable hygienic surroundings, warmth and good food are indispensable. Warm applications over the loins are helpful.

Passive hyperemia.—The treatment largely depends upon the cause, but too much importance cannot be given to the treating of the vasomotor fibers of the kidneys from the eighth dorsal to the first lumbar. Textbooks state that the vasomotor fibers to the kidneys are from the ninth to the twelfth dorsal vertebrae, inclusive, but osteopathic experience shows we can affect vasomotor fibers slightly higher. Treatment here has a distinct effect on the blood pressure within the glomeruli. The renal epithelium is extremely sensitive to circulatory changes. Even the compression of a renal artery for only a few minutes causes marked disturbances. Hence any irritation or obstruction to the vasomotor innervation of the renal blood-vessels may result in serious conditions. The superior cervical ganglion of the sympathetic and the sciatic center have important bearing on the secretions of the kidney, through vasomotor fibers. Due attention should be paid to the bowels, and the patient required to take plenty of rest and a light diet.

Acute Parenchymatous Nephritis

(ACUTE BRIGHT'S DISEASE)

Definition.—An acute, inflammatory process affecting the epithelium of the uriniferous tubules and due to the action of cold or toxic agents upon the kidneys, as well as to injuries to the renal splanchnics; is characterized by certain nervous symptoms with fever, dropsy, and scanty and highly colored urine. This inflammation involves more or less the whole kidney.

Osteopathic Etiology and Pathology.—This disease is caused by exposure to cold and wet while the body is warm and perspiring. Excessive use of alcohol may be a factor. May be caused also by infectious diseases, such as scarlet fever, diphtheria, measles, smallpox, acute tuberculosis and others; also by certain specific poisons which are

eliminated by the kidneys, as turpentine, chlorate of potash, carbolic acid, phosphorus, ginger, cantharides and oil of mustard; also by pregnancy, as this is supposed to compress the renal veins, or through toxic agents. Syphilis may be an underlying cause. Blows and injuries to the back at the tenth, eleventh and twelfth dorsals are frequently the cause. Lesions are found from the sixth dorsal to the fourth lumbar. The lower three ribs may be at fault, while the innominate and muscular contractions have been found to be pathological factors. Lordosis may be a contributing cause. Loudon places considerable importance on cervical lesions and McConnell believes vasomotor disturbance plays an important causative role in the disease.

Pathologically, at times the kidney alteration may be so slight as not to be recognizable by the naked eye, the appearance varying according to the stage and severity of the disease. The kidneys become enlarged, engorged and of a bright red color, and later have a mottled appearance; and when the capsule, which is non-adherent, is stripped off, the kidney is found to be soft and inelastic. In most of the cases in which the disease is due to toxic agents brought to the kidney through the blood-vessels, the glomeruli suffer first. The epithelium of the glomeruli and tubules is the seat of cloudy swelling and, in the later stages, of fatty change and hyaline degeneration. The tubules are clogged by altered cells, leucocytes and blood-corpuscles. In mild cases the interstitial tissue is simply inflamed, but in all cases it becomes more or less mixed with leucocytes and red blood-corpuscles. Osteopathic lesions produced upon animals in the region of the ninth to the twelfth dorsal, resulted in acute nephritis. The autopsy findings were distinctly typical.

Symptoms.—The onset is usually sudden, with moderate fever, pain in the back in the lumbar region and over the kidneys and following the ureters. Nausea and vomiting may be present. Dropsy soon appears, beginning with slight swelling or puffiness in the face below the eyes, later showing itself in edema of the abdominal walls and extremities. Uremic symptoms may develop. The urine is characteristic; is diminished in quantity and of high specific gravity; at first the sediment is copious and reddish brown in color, becoming less in amount and of high color. This sediment contains casts of the uriniferous tubules, free blood, epithelial cells, uric acid and urates. There are large quantities of albumin in the urine.

The presence of albuminous matter in the urine, even in large quantities, is not sufficient evidence to warrant a diagnosis of Bright's disease

nor is the amount a guide as to the severity of the case, for grave conditions often show a slight amount (Loudon).¹

Diagnosis.—The general symptoms may be very slight, for the most severe cases may manifest slight edema of the feet, or there may be only the puffiness under the eyes and of the eyelids. In such cases the diagnosis must depend upon examination of the urine. With previous history, suddenness of the attack and character of the urine, ordinarily the diagnosis will be quite easy.

Prognosis.—Although this disease is generally grave, the prognosis is favorable and the majority of cases recover under judicious treatment.

Treatment.—Cases of acute nephritis require rest, quiet and warmth. Many cases recover under these conditions alone. It is absolutely necessary, however, that these conditions exist no matter what other treatment is used. A thorough treatment to the renal splanchnics cannot be overestimated for it is here (tenth to twelfth dorsal, inclusive) that a majority of the lesions producing acute nephritis occur. Besides correcting the vertebral and rib displacements in this region, a very effective treatment is to have the patient lie flat upon the back and then the osteopath, reaching around the patient with the fingers of one hand on either side near the spines of the lower dorsal vertebræ, raise the patient so that the entire body, except the shoulders and the feet, are lifted clear of the bed. Thus the treatment springs the spine anteriorly and produces a marked effect upon the kidneys through the renal vasomotor nerves. Occasionally lesions in the upper cervical region interfere with the normal activity of the renal nerve fibers passing to the kidneys by way of the superior cervical ganglion of the sympathetics.

Another very effectual treatment for the kidneys is treating them through the abdomen by a careful pressure upon the kidneys through the abdomen on either side of the umbilicus, thus lightly working each kidney outward and upward. This treatment relaxes any tissues about the blood-vessels, nerves and lymphatics to and from the kidneys that may be contracted and thus aids in establishing a normal activity of the involved organs. It also helps in relaxing tissues about the ureters and prevents the clogging up of the latter with debris. Bandel and Stearns report cases in which an impacted colon was an important factor in this particular.

The above means have for their object the direct relief of the congestion of the kidney. This is further aided by keeping the bowels active, which supplements the action of the kidneys, and by increasing

1. Journal of the American Osteopathic Association, July, 1904.

the activity of the skin. This also aids in relieving dropsical effusions. The hot pack, in which the patient is wrapped in a wet sheet and then covered by a number of blankets, is an exceedingly good method to relieve the kidneys of some of the work and lessen their congestion, besides arresting uremic intoxication. This can be repeated daily if necessary. Where there is dropsy and scanty urine, the indications are to increase the secreting action of the kidney; besides treatment through the renal splanchnics, which contain the vasomotor nerves of the kidneys, stimulating treatment to the vagi will help to increase the urinary secretion. Hot fomentations, placed directly over the region of the renal splanchnics, is a valuable aid in cases which do not respond quickly to osteopathic stimulation. Treatment of the liver is important. Injections of cold water into the intestines will tend to stimulate the secretion of the kidneys, but this should be used with the greatest caution; in some cases tepid water would be better (see uremia).

The diet of the patient with acute nephritis is important. Give food that is easy of digestion and which contains a minimum amount of nitrogen. The stomach is quite likely to be irritable, consequently food that is adapted to it should be selected. Milk and weak animal broths are undoubtedly the best foods. The return to a solid diet, especially of meat, should be very slow. Suitable adjuvants to the milk diet are rice and farinaceous preparations. Loudon¹ recommends complete withdrawal of all foods for twenty-four to forty-eight hours and the reducing of nitrogenous foods to a minimum; a diet of milk and cream after the fast, followed by cereals and broths, then eggs and fish until albumin disappears from the urine. Alkaline mineral waters are useful to help maintain an alkaline urine, thus tending to withdraw exudates. The patient should be treated daily at first and later on every other day, for case reports show frequent treatments hasten recovery.

For treatment of acute uremia in Bright's disease, see uremia. Complications should be treated as affections independent of the renal disorder.

Chronic Parenchymatous Nephritis

Definition.—A chronic inflammation of the kidney, involving the epithelium, glomeruli and interstitial tissue, characterized by dropsy, increasing anemia, albuminous urine and acute uremia.

Osteopathic Etiology and Pathology.—It may be the result of acute nephritis. It follows the same diseases as already mentioned in

1. Journal of the American Osteopathic Association, Dec., 1904.

acute nephritis. More often it follows the same diseases as already mentioned in the acute form, syphilis, tuberculosis, purulent conditions, focal infections (streptococcus), alcohol, scarlatina and pregnancy contributing the greater number. It is more common in the male sex and in early adult life. Habitual exposure to cold and dampness; chronic lesions of the spine, chiefly in the lower dorsal region, are causative factors.

Pathologically, the **large white or a yellowish white kidney** is the most common kidney lesion. In this form the kidney is enlarged, often to twice its normal size, is smooth, and the capsule very thin. The tubes, on microscopic examination, are found to be choked with broken-down granulated epithelium and fibrinous casts. The capillaries show hyaline changes. The interstitial tissue is increased everywhere, but not to an extreme degree. Catarrhal swelling and hyperemia (to a slight degree) are found in the pelvis of the kidney.

In the **second stage**—that of the **small white kidney**—there is a reduction in the size of the organ, due to the destruction of the renal epithelium and the contraction of the overgrown connective tissue. Some hold that this may be a primary, independent form and not always preceded by the large white kidney. The organ is pale in color, rough and granular, the capsule being thickened and somewhat adherent. There is an accumulation of fatty epithelium in the convoluted tubules, constituting marked areas of fatty degeneration and giving the organ a white or whitish yellow appearance. It is this which gives the name of small granular fatty kidney to this form. There are extensive interstitial changes, degeneration of tubules and destruction of great numbers of the glomeruli.

Chronic hemorrhagic nephritis is a variety associated with this stage. The organ is enlarged, and scattered throughout the cortex are found brown hemorrhagic foci due to hemorrhages into and about the tubes. Otherwise the changes are similar with those found in the first form.

Symptoms.—It usually begins as a chronic affection and the symptoms slowly become apparent. Failing health and loss of strength, dyspepsia and anemia, waxy appearance with puffiness of the face, dropsy and increased arterial tension with hypertrophy of the left ventricle, gradually make their appearance. Uremic symptoms are common, while dropsy is marked and persistent. Vomiting and sometimes profuse diarrhea occur; in fatal cases there is sometimes found to be ulceration of the colon. The urine, as a rule, is diminished in quantity, is

often very scanty, although it is frequently normal in color and appearance. There is an abundance of albumin, heavy sediment, hyaline and granular tube casts, epithelium from the kidneys and pelvis, leukocytes and often red blood-corpuscles. If fatty degeneration takes place, there will be fatty casts and oil globules. In the later stages the urine is abundant, low specific gravity, considerable albumin, and many casts.

Diagnosis.—In the inflammatory stage, where there is enlargement of the kidney, extreme pallor, scanty urine, albumin, and tube casts, history of infections, pregnancy, or exposure to cold and wet, and lesions in the lower dorsal region, the diagnosis is clear.

Prognosis.—Always give a guarded prognosis; relapses are frequent, but cases have been cured. There is always a tendency for the sub-chronic forms to become chronic.

Treatment.—The treatment requires persistent work, especially over the renal splanchnics, and strict attention on the part of the patient to hygienic principles. The lower dorsal lesions are very apt to be refractory owing to extensive fibrotic changes of the deep muscles and capsular ligaments. But repeated effort will usually secure results. Care should be taken as to exposure to cold and overexertion. The quality of the blood should be improved, as it is anemic and contains various toxic products. Strict attention should be paid to the diet. Iron is largely used for anemic conditions, but this principle we hold to be wrong. It is not more iron that is wanted, but an ability of the system to assimilate the iron which it has. Relative to diuretics von Noorden says: "It would be the greatest paradox to economize the renal work to the utmost in one direction (diet, sweating, etc.) and on the other hand excite them to increased activity by means of the strongest stimulants we possess, (drugs). I regard such prescribing as radically wrong." The diet should be carefully selected and of minimum amount. The pure milk diet is undoubtedly the best. The use of meat seems to favor uremic convulsions.

The digestive organs should be kept in as good condition as possible, particular attention being paid to the liver and bowels. The use of suitable clothing is important; wool should be worn next to the body. The skin is a powerful adjuvant to kidney elimination, and the suppression of the action of the skin throws extra work on the kidneys. Possibly stimulation of the lung function would aid in the elimination. Rest, with a proper amount of fresh air and out-door exercise, is essential.

In conditions calling for attention to the skin and bowels the treatment will be the same as in acute parenchymatous nephritis. There is a ganglion on each side of the umbilicus within a radius of an inch that sends fibers to the kidneys (Dr. Still). Just what is the function of these ganglia is unknown. The treatment of the complications is independent of that for the renal trouble. For direct treatment to the kidneys see acute Bright's disease.

Interstitial Nephritis

Definition.—A chronic inflammation of the kidney in which there is reduction in its size due to an extensive destruction of the tubular substance, with an overgrowth, and later a contraction, of the connective tissue elements. Cardio-vascular changes, arteriosclerosis and cardiac hypertrophy are usually associated.

Osteopathic Etiology and Pathology.—Osteopathic lesions to the renal splanchnics are important predisposing causes. The disease may follow parenchymatous nephritis; or it may be caused by a continued passive congestion due to valvular heart disease. Gout; cystitis (often following gonorrhea), the inflammation extending up the ureters to the kidney; heredity; old age; long continued worry, anxiety or grief; chronic alcoholism, overeating; syphilis; tuberculosis; focal infections, especially of streptococci; chronic mineral poisoning (as from lead), and alterations in the renal ganglionic centers are causes. It chiefly occurs in males during middle life.

Pathologically, both kidneys are involved (although one may be more affected than the other), and reduced in size, often to less than half their normal size. After removing the capsule, which is thickened and adherent, the surface is found to be uneven, or granular and containing small cysts. The kidney is hard, tough and resistant, the color varying from a darkish brown to a yellowish gray. The cortical portion is especially reduced in size. On microscopic examination, the connective tissue appears greatly increased; this contracts, compressing the tubules and blood-vessels, causing their destruction. There is general arterial sclerosis, and the left side of the heart is hypertrophied. There are frequent nasal and retinal hemorrhages, due to the brittleness of the arterial walls which predispose them to rupture; hence, apoplexy is a frequent termination. The ganglionic centers, being interfered with, undergo fatty degeneration and atrophy. There are marked retinal changes—retinitis, fatty degeneration of the retinal tissues and sclerosis of the nerve fiber layers.

Symptoms.—The onset is insidious. In most cases the symptoms are latent. The general health is disturbed; there are frequent micturition, gastric disturbances, tense and bounding pulse, hypertrophy of the left ventricle, high blood pressure, disorders of vision, sleeplessness, headache, furred tongue, slight swelling of the feet, dry skin, scurvy and shortness of breath. The urine is increased in quantity, of acid reaction, light in color, low specific gravity, with a small amount of albumin, a few hyaline casts, and some epithelial cells. There is increased thirst and the patient may have to urinate two or three times during the night. There is well marked mucous cloud, slight sediment, and as the disease advances the urine may be diminished, the albumin increased and the casts become more numerous, while occasionally blood-cells will be found.

Much importance should be attached to the blood pressure condition.

Diagnosis.—The early stages are not always recognizable. Later, while there is high arterial tension, thickening of the arterial walls and marked hypertrophy of the heart, the urine should be examined very carefully both night and morning, as the diagnosis will greatly depend upon the condition of the urine, which is increased in quantity, of low specific gravity, with a trace of albumin, narrow hyaline and pale granular casts, making the diagnosis usually easy.

Prognosis.—It is generally incurable, but favorable so far as the power to prolong life is concerned, provided the diagnosis be made early in the case, and the patient lives a quiet life. The case usually terminates with convulsions, coma and death. Apoplexy is frequently associated with chronic nephritis. In all forms of chronic nephritis some intercurrent infectious disease is quite possible, which is apt to be serious owing to the cachectic state.

Treatment.—The dietetic and hygienic treatment is the same as in chronic parenchymatous nephritis. The nerve and vascular supply to the kidneys should be treated as in acute parenchymatous nephritis. Freedom from worry and overwork, and if possible change of climate, should be prescribed. Frequent bathing, with friction of the skin, should be insisted upon and the bowels kept regular by a treatment of alkaline water. In all kidney cases special attention should be given the liver. The alkaline water is a good diuretic; besides it flushes the kidneys and helps to remove the debris.

These cases invariably present a rigid spine which should be carefully but thoroughly treated, traction being one of the methods that give

comparatively quick and excellent results. Overcoming spinal immobility, correction of the dorsal area, attention to the chest rigidity, and frequently raising the abdominal organs will often considerably reduce the blood pressure.

The accidents and complications which so often endanger the patient, must be treated as they arise.

Amyloid Kidney

Definition.—A pathological state of the kidney in which there is a peculiar infiltration into the kidney structure of an albuminoid material of a waxy appearance.

Etiology and Pathology.—This is associated with Bright's disease and other wasting diseases. It is most frequently caused by profuse and long continued suppuration, especially of the bones, by syphilis, tuberculosis, cancer, lead poisoning and gout.

Pathologically, the kidney is large and pale, but it may be normal in size or even small, pale and granular. The capsule is not adherent, the surface of the kidney, after removing the capsule, is pale and anemic. On section the cortex is seen to be enlarged. It is homogenous, anemic, pale, waxy and resisting. On microscopic examination there is found to be an infiltration of a homogeneous or wax-like material. This progresses until all parts of the organ are infiltrated. As the result of this pressure the structures of the kidney undergo an atrophic degeneration, the kidney becoming contracted, smaller, rough and even distorted in shape. The cortex becomes narrowed and the capsule adherent. If a section of an amyloid kidney be stained with a solution of iodine, numerous mahogany red points appear.

Symptoms.—There are similar changes in the liver, spleen and often the intestinal canal. There is a profuse, watery diarrhea, due to amyloid changes in the intestinal canal, with loss of flesh and strength, edema of the lower extremities, and ascites. There is an increased flow of pale, watery urine, of low specific gravity; albumin is abundant and usually hyaline, often fatty or finally granular tube casts occur.

Prognosis.—As a rule the prognosis is decidedly unfavorable and it must be controlled by the disease with which it is associated.

Treatment.—The primary disease demands attention, otherwise the measures of treatment indicated are those of chronic parenchymatous nephritis, with special attention to the general health and surroundings of the patient. Give a generous diet and be persistent with the treatment.

Pyelitis

Pyelitis is inflammation of the pelvis of the kidney. When a suppurative inflammation extends into the interstitial tissue of the organ, it produces a condition called pyelonephritis. The inflammation usually starts in the pelvis of the kidney, the infection being carried there either by the circulation or the urinary tract, but it soon involves the rest of the kidney. Pyelitis is usually secondary to some other conditions such as urethritis, cystitis, or ureteritis. "Infection of the kidney rarely takes place through the blood and only when the vital membrane of the kidney is impaired." It may start from within the organ in the interstitial tissue, caused by infectious embolism or traumatism, or the tubules may become obstructed by concretions.

Osteopathic Etiology and Pathology.—Retained decomposed urine due to pressure upon the ureters by tumors or bladder disease; calculus concretion, kinked ureter, displaced kidney, traumatic agencies, as falls, blows, strains, kicks or penetrating wounds; nephritis, pregnancy, cold and wet, are causes. Pyelitis may follow cystitis, the inflammation extending up the ureters to the pelvis of the kidney and thence to the substance of the organ, inducing pyelonephritis. Tuberculosis, focal infections, and intestinal disorders (colon bacillus), are other causes. Lesions from the ninth dorsal to second lumbar or lower, and malnutrition are predisposing factors.

Pathologically, the mucous membrane of the pelvis is usually the first affected, the inflammation generally extending from below upward. It is swollen and sometimes visibly congested and of a gray color. The pelvis and calyces are more or less dilated, while the papillæ are flattened. There is a gradual dilatation of the calyces and atrophy of the kidney substance, until the whole organ may be converted into a pus sac. If complete obstruction occurs, the fluid portion may be absorbed and the pus become inspissated and cheesy. The ureter is often dilated. In tuberculous pyelitis the apices of the pyramids are also invaded, the kidney substance is broken down and the result is the same. In the pyelitis caused by cystitis, the infection passes up the tubules or is carried by the lymphatics. The abscesses extend along the pyramids, burst through the papillæ and calyx into the pelvis of the kidney, and thus also the kidney becomes a purulent sac.

Symptoms.—Pain and tenderness over the region of the kidney first appear. In a few cases cystitis will be the only symptom. The suppurative stage is marked by high fever and a chill or a succession of

chills. The general condition of the patient denotes prolonged suppuration. There is failure of health and more or less wasting and anemia. The urine is characteristic, contains pus, which varies in quantity greatly, and where only one kidney is affected, may be suppressed for a time and there will be a sudden outflow of the pus, due to the breaking of the sac. Blood is also very constant, but hardly ever of sufficient quantity to be seen by the naked eye. The urine is usually diminished in quantity and the color pale; the specific gravity is low on account of the small amount of urea present. The reaction of the urine is acid. Pus and blood render the urine slightly albuminous. Casts from the kidney, and even portions of the kidney, may be present.

Diagnosis.—From **nephritis** by the absence of much albumin, tube casts and dropsy. From **cystitis**, by the history, lumbar pains and acid urine. **In cystitis the urine is always alkaline.** From **perinephritic abscess**, by the absence of edema over the lumbar region. The urine may be normal and there are lumbar pains and hectic fever. In **tuberculous pyelitis** there is a history of tuberculosis in other organs and there are tubercles in the urine. **Malaria** or **typhoid** may be suspected. The X-ray and cystoscope should be employed. An exploratory incision may be necessary.

Prognosis.—Depends altogether on the cause and extent of kidney involvement. In simple cases and some tubercular, recovery may occur, although there is a tendency in all cases for the disease to become chronic.

Treatment.—Depends upon the cause, but thorough treatment along the lower dorsal, the lumbar and sacral regions will be of considerable benefit in controlling the catarrhal process in the kidney, its pelvis, the ureter and the bladder. If pathology permits, gently raising the kidneys, ureters and neighboring organs, knee-chest position, will materially assist circulation and drainage. Fresh spring waters for diluents and restricting the diet to light food, preferably milk, are indicated. Rest is important and warm applications locally are sometimes helpful. The general health must be carefully watched as there is always considerable drain upon the system. A timely operation may materially lengthen the life in many cases. Attention to the bladder, urethra and prostate is necessary.

Uremia

The name applied to a series of manifestations resulting from the retention of poisonous materials in the blood, which should have been removed by the kidneys. Uremic symptoms may occur any time dur-

ing an attack of nephritis. In chronic cases it seems likely that extensive destruction of renal tissue is the principal factor that leads to the toxemia. They may also occur when the circulation of the blood in the kidneys is interfered with or the ureters are obstructed. They are not due alone to the urea (which is found to be increased in the blood), but more probably several poisons that are retained in the blood. Traube's theory is that acute cerebral edema with anemia accounts for the symptoms. Halbert says: "A more recent and more plausible claim is to the effect that a poison is developed in the body as the result of nephritis," for retention of effete matter or ligation of renal arteries and ureters or impaired renal activity does not fully explain the cause of the stupor, coma, convulsions, sometimes paralysis, and gastro-intestinal disorders.

Symptoms.—Loss of appetite, nausea, vomiting, headache and drowsiness are the initial symptoms. Headache is usually at the back of the head and may extend down the neck. The next symptom is coma, alternating with convulsions which may range from only a slight twitching to violent epileptiform spasms. These spasms may occur without the slightest warning and are often followed by blindness which may last for several days. These attacks of coma and convulsions are sometimes ascribed to localized edema of the brain.

Transient paralysis is also due to congestion or edema of the brain and it may be of the cord. There may be mania which comes on abruptly, although the delirium is not at all violent, while profound melancholia may be found. There may be nervous symptoms develop, such as numbness in the hands and fingers, itching of the skin and cramps in the muscles—especially those of calves of the legs. Pulmonary symptoms are sometimes continuous—dyspnea, paroxysmal dyspnea and Cheyne-Stokes' breathing. These attacks of dyspnea may be as distressing as true asthma. Cheyne-Stokes' breathing may be present without coma.

Uncontrollable vomiting may set in with great abruptness, followed by hiccough and purging. There may be a catarrhal or diphtheritic inflammation of the colon with diarrhea. The breath has a urinous odor and the tongue is often very foul. The pulse is slow and full, with a temperature below the normal, although during convulsions the pulse may become rapid and the temperature rise. Occasionally there are atypical forms of uremia which may be very confusing and obscure.

Diagnosis.—The history, subnormal temperature, the urinous odor of the breath, high arterial tension and increased second sound of the heart will distinguish the condition. Feeling of numbness, palpitation, headache, restlessness, mental wandering are not infrequently

early symptoms. The phenolsulphonephthalein test for the secreting power of the kidney, and the examination of the urea in the blood are of great aid in diagnosis.

Prognosis.—Extremely grave, but one should always be very careful in his prognosis, for there is a possibility of recovery, even after the most serious symptoms have been manifested.

Treatment.—As impermeability of the kidneys produces uremia, by not allowing the various poisons to be eliminated by the renal path as they should be, the treatment must be applied directly to the kidneys. Elimination is demanded and if treatment through the abdomen to the kidneys directly and to the renal splanchnics does not bring about prompt and thorough elimination of the intoxicating properties, the bowels and skin must be made active. The vapor or hot-air bath or hot pack should at once be used. An ice-bag to the head will be beneficial. An increase in the quantity of urine may be brought about by the displacement of a part of the mass of blood, which is in relative stagnation in certain parts of the vascular system. Forcing it into the main circulation in order to increase the pressure within the vessels of the kidney, is the treatment indicated. This great stagnant mass of blood is found in the arterial capillaries of the portal system in the liver and splenic tissues and should be manipulated into the general circulation in order to increase the arterial tension of the kidneys and thus favor elimination. The treatment should mainly be applied to the vasomotor nerves of the portal system, from the fifth to the ninth dorsal, and directly over the abdomen, liver and spleen.

The introduction of water, from 110 degrees to 120 degrees, or even 150 degrees, into the colon by means of injections, is useful; warm irrigations increase renal secretion, bowel action and sweating with a decrease of tension. Cold drinks will stimulate the abdominal vessels and induce absorption of a certain quantity of water to still further increase diuresis. Cold irrigation increases blood pressure temporarily, but later it lessens the pressure; it should be used only with great caution. Milk is one of the best drinks to be used. Secretions of the liver must not accumulate. The bile must be expelled so that its toxicity will not be added to the other poisons.

The food of the patient is an important matter. A milk diet is best; avoid meat and nitrogenous foods and any food that leaves much residue. In this way the nutrition of the patient is kept up with a minimum of urea formation and, besides, there will be very little intestinal putrefaction. Emergency measures not mentioned above are repeated high

normal salt enemata (two to three pints), the alcohol sweat and venesection (about one pint). When the attack is broken the condition resolves itself into the renal disorder, generally acute Bright's disease.

This disease illustrates one phase of the uselessness of drugs; for when the impermeability of the kidney has become such that it ceases to have the power of eliminating toxic substances formed by the organism, there is then retained the medicinal substances. The kidney is as impermeable for therapeutic poisons as for the natural poisons and the employment of toxic medicines in such cases has often no other effect than to bring an association of medicinal intoxication with an uremic.

Renal Calculus

Renal calculi are concretions formed by precipitation of solids derived from the urine, and are found in the kidney or its pelvis. If large, they are called stones; the smaller masses are known as gravel or sand, according to their size. When the stones attempt to pass through the ureters, it brings on an attack of renal colic; rarely are they voided without this symptom.

Osteopathic Etiology and Pathology.—The affection occurs at all ages, more commonly, however, in children and in old people. The male sex is more liable than the female. Sedentary habits; gout and excessive meat eating are predisposing causes. Heredity seems to be a predisposing cause in some families. Inflammation of the pelvis of the kidney, caused by derangement of the ribs and vertebræ of the tenth, eleventh and twelfth dorsals or first lumbar, is an important etiological factor.

Pathologically, the chemical varieties are:

(1) **Uric acid and urates** are the most common. The stones are usually smooth or lobulated; are hard and of a reddish color. Usually in these stones, both uric acid and urates are to be found. This material may be passed in the form of sand or large stones. The sediment in the urine may be the nuclei of the stones; as may foreign matters, such as the mucus or desquamated epithelium caused by the inflammation of the pelvis of the kidney, blood clots, or, in fact, any foreign matter that may reach the urinary passages. Individuals passing a small amount of urine, and old people are the principal subjects. "As a consequence of concentration and high acidity of the urine, the uric acid and urates are readily separated in solid form and held together by the albuminous matrix."

(2) **Phosphatic Calculi** are white in color, soft and mortarlike.

They are composed of phosphate of lime, ammonia and magnesium phosphate. These are found more often in the bladder than the kidney. Disease of the bladder is the cause.

(3) **Oxalate of Lime** are a mixture of oxalate of lime and uric acid. They are dark in color, very hard and uneven, with hard, pointed projections. On account of their uneven shape they have been named mulberry calculi. These stones produce great pain as they pass through the ureters.

There are other concretions of rare occurrence.

Symptoms.—There is pain in the back in the region of the kidneys with more or less tenderness. The pain may be severe and paroxysmal. There may be bleeding, which is seldom profuse; this will give the urine a smoky hue, but may be present to such a small degree as to be only apparent by the use of the microscope. The stone may obstruct the ureter and cause pyonephrosis or hydronephrosis. Pyelitis of a catarrhal character is common. In pyelitis there may be intermittent fever of several degrees, then sweating. There may or may not be pus in the urine.

Renal Colic is caused when the calculus attempts to pass through the ureter so that ureteral spasms result. The stone, however, may become lodged at the entrance to the ureter. There is a sudden onset and great pain which starts in the back, radiating downward into the groin, down the side of the thigh and into the testicle and glans penis. The testicle is often retracted, the face pale, the features pinched, and there is frequently vomiting. There are cold sweats and the pulse is weak. The paroxysm may last only a few minutes or extend over several hours. If uric acid is found, it points to uric acid or oxalate of lime calculi and the urine is acid in reaction. If alkaline phosphatic stones may be suspected, examination of the urine directly after the attack aids greatly in diagnosis, for at other times the urine is usually negative.

Diagnosis.—**Biliary Colic.**—The jaundice in biliary colic comes on very soon after the obstruction begins. The stools are without bile and the pain extends from the right hypochondriac region to the upper abdomen and the right shoulder. The urine is negative and a stone may be passed in the stools. **Renal colic** is often **simulated** when the ureter is obstructed from any cause whatever. It may be compressed from a floating kidney or tumor, or obstructed by a clot of blood, fragments of hydatid cysts or plugs of mucus. **Lumbo-abdominal neuralgia, intestinal colic, and renal tuberculosis may simulate renal colic.** The X-ray plate is of decided value.

Prognosis.—As complications may arise, it is best to give a guarded prognosis, but the prognosis is generally favorable. It is a disease that is very apt to recur when strains or falls affect the innervation to the kidney, but many cases have been permanently cured. If the stone is large, its passage along the ureter may prove fatal unless surgical interference is instituted at once, but if it is renal sand it may be easily voided in the urine and thus the prognosis will be favorable.

Treatment.—Treatment should be given toward overcoming the cause producing the calculi, which will often be found at the tenth rib. Treat the kidneys thoroughly, both through the renal splanchnics and directly through the abdomen, anteriorly. But direct abdominal treatment should be given very cautiously. Treatment here corrects disorders and seems to release some solvent that acts upon the various forms of calculi and disintegrates the ones already formed and prevents the formation of others. Possibly this solvent is an internal secretion of some gland; possibly like the splenic secretion is to the biliary calculi (Dr. Still.). Dr. Still held that one of the functions of the suprarenal capsule was to prevent the formation of these concretions.

In the **uric acid tendency**, the free use of alkaline mineral waters for the solution of uric acid may be helpful. Much may be done by dieting. The amount of nitrogenous food should be limited, eating a minimum amount of meat and using plenty of milk and vegetables. In the **phosphatic tendency**, diluted drinks freely used are helpful. Meats are indicated. Milk and vegetables should not be used freely as they tend to make the urine alkaline. In all instances care of the general health and avoidance of beer drinking and excessive meat eating are demanded.

During an attack of **renal colic**, when a stone had lodged in a ureter, one may be able, by very careful manipulation, to aid the stone in its progress downward, (somewhat after the manner of manipulating gallstones), but do not delay surgical measures too long. By inhibiting the nerve force of the spinal nerves along the lumbar and sacral regions (chiefly tenth dorsal and first lumbar), relief may be given. The nerves of the ureters are derived from the inferior mesenteric, spermatic and pelvic plexuses. Employ the hot bath; this may relax the spastic condition. Cloths wrung out of hot water and applied locally are of aid. Occasionally a change of posture will give relief. Even inversion of the patient is sometimes followed by immediate cessation of the pain. The patient may drink freely of hot lemonade or water. An anesthetic may be of aid in the manipulation of a renal calculus in the ureter, as the

anesthetic will relax the tissues over the abdomen, making it much easier for one to get near the impacted calculus, but **be cautious**. Morphine may be necessary. During the intervals the patient should lead a quiet life and avoid sudden exertions of any kind. It is important to keep the urine abundant, consequently have the patient drink a large quantity of distilled water. "Renal calculus is brought about by lesions affecting the suprarenal capsule of the kidney, or spinal lesions from the tenth dorsal to the first lumbar, affecting the lower ribs."

Movable Kidney

This means a distinctly mobile condition of the kidney (almost always acquired, but may be congenital), due to the lax condition of the tissues which support it and to the elongation of the renal vessels which allow the kidney to move in certain directions. Rapid loss of tissue that absorbs the fat surrounding the kidney is a cause. There are almost invariably lesions in the dorso-lumbar region that predispose to an abnormal mobility of the kidney. These lesions undoubtedly weaken the innervation to the surrounding and supporting kidney structures. A posterior spine, with consequent downward and constricting displacement of the floating ribs, is common, although lateral and anterior spines (dorso-lumbar region) may be found. Strains, heavy lifting, and various violent exertions are important exciting factors. Tight lacing, pregnancies, an enlarged liver and gastro- and enteroptosis are also important factors. This condition is found more commonly in women, and undoubtedly is a frequent cause of direct, gastro-intestinal, reflex, and obscure disturbances. There are very different degrees of mobility in different cases. It may be so slight as hardly to be recognized or so great that it can easily be felt by the hand through the abdominal walls, resembling a movable tumor in the abdomen.

Symptoms.—Often there are no noticeable symptoms. Sometimes when the displacement and mobility of the kidney are most marked, the reflex symptoms are not noticeable. The right kidney is the one usually affected, on account of its relation to the liver which moves during the respiratory act. Usually there is pain in the lumbar region and the patient experiences a heavy, dragging pain in the abdomen, which especially manifests itself while standing and walking. There may be intercostal neuralgia. Various colicky and other gastro-intestinal pains, and nervous symptoms as neuresthenia, melancholia, hysteria and headache are common. There may be obstinate indigestion, palpitation of the heart, flatulence and cardialgia; also, an irritable bladder, due to pressure.

At times the kidney becomes tender and swollen as a result of twisting of the renal vessels or of the ureter (Dietl's crises), causing engorgement of the organ; this may be associated with agonizing pain and symptoms of collapse. Hydronephrosis may be manifested.

Diagnosis.—The shape of the tumor, marked mobility, and lessened resistance on percussion of the renal region will make the diagnosis. The disorder very rarely proves fatal. In doubtful cases utilize the X-ray.

Treatment.—Many cases rarely give trouble directly, but may be a source of reflex and obscure symptoms. Attention to the general health of the patient and persistent treatment of the dorso-lumbar region greatly strengthen the relaxed tissues about the kidney and cure a number of cases. Having the patient attempt to replace the organ after he goes to bed will be of value. Treatment of the abdomen to strengthen the walls and lessen any liver congestion and to keep the bowels active is very beneficial. Teach the patient how to stand and walk correctly, especially holding the abdomen in and up. A liberal diet to the point of increasing the weight is worthy of trial. The use of supports is not always satisfactory. Surgical treatment for fixing the kidney is of permanent value, but do not advise operation unless absolutely indicated. (See Prolapsed Organs, Part I).

To determine the presence of a movable kidney, it is best to have the patient in the dorsal position, the head slightly lowered and the abdominal walls relaxed by flexing the thighs moderately upon the abdomen. Then with the left hand in the lumbar region behind the eleventh and twelfth ribs, and the right hand in the hypochondriac region, the kidney can usually be detected after full inspiration followed by complete expiration; or, have the patient in a standing posture with the body bent slightly forward and the hands placed upon a table, then perform bimanual palpation; or, perform the manipulation in the knee-elbow position. When in this position (knee-elbow), if the kidney has become dislodged, a resonant note will be obtained by percussion over the normal location of the kidney.

DISEASES OF THE BLADDER

Cystitis

Cystitis is an inflammation of the mucous membrane of the bladder. Retention of the urine; foreign bodies, such as stones, in the bladder; the use of dirty catheters; exposure to wet and cold; injuries to the

bladder and over the pubes; irritations to the sacral nerves; spinal lesions in the dorsal enlargement of the cord; innominate lesions; irritating drugs; enlarged prostate and urethral strictures are the principal causes of cystitis. The disease may be secondary to fevers, infectious diseases and inflammation of adjacent organs. A displaced uterus may produce a chronic irritation of the bladder.

Pathologically, there is hyperemia of the mucous membrane of part or of the whole of the bladder, with redness, congestion and edema. The secretion of mucus that covers the mucous membrane is of a dirty gray color. If the congestion is very extensive, a bursting of the capillaries may take place. In a few cases the neck of the bladder and the urethra, where it passes through the prostate, is involved. In chronic cases the mucous membrane becomes thickened and covered with patches of false membrane. The muscular coat of the bladder becomes hypertrophied and the veins tortuous.

Symptoms.—The onset may be sudden with rigors and fever, but in many cases a frequent desire to micturate will be the first symptom. This is followed by tenderness and pain over the bladder and contiguous parts, loss of appetite, depression and sleeplessness. Tenesmus of the bladder, caused by a spastic condition of its muscles, and a burning along the urethra are usually present. The urine is alkaline in reaction and contains pus, epithelium and blood.

Diagnosis.—The diagnosis is usually easy. **Pyelitis** causes pains in the lumbar region and along the ureters and there is a frequent desire to urinate. The bladder is not subject to spasms and the urine is of an acid or neutral reaction.

Prognosis.—In many cases the prognosis is favorable, but in cases of long standing and in hypertrophy of the bladder, prognosis must be guarded.

Treatment.—Rest in bed with strict attention to diet is necessary. Milk is the best food and avoid highly seasoned articles and acid foods. The use of plenty of pure water is helpful to dilute the urine, and if necessary the bladder should be washed out carefully. If the case is severe, emptying the bladder several times a day with a catheter will be necessary. Always be careful about the cleansing of the instruments. Warm applications over the pelvic region will be comforting to the patient. Lifting the abdominal viscera from the bladder is of assistance. The patient may be placed in the knee and chest position for this or the usual method employed.

Treatment to the second, third and fourth sacral nerves controls the neck of the bladder, and strong inhibition will generally control the spasms of the sphincter. The fundus of the organ is supplied by sympathetic fibers from the pelvic plexus. Direct treatment over the bladder, if applied carefully, will act on the terminal fibers of the sympathetic. Lesions to the nerves of the sphincter of the bladder oftentimes occur between the fifth lumbar and sacrum, also from a displaced innominate. Such lesions are apt to be found in cases of incontinence of urine. The lesion to the vertebra is usually a lateral one.

Thorough treatment to the genito-urinary center (lower dorsal and upper lumbar) will also be of aid. In males direct treatment of the prostate gland is occasionally important as is also the plexus of nerves at the trigone of the bladder. In **treating the prostate gland** introduce a finger into the rectum and work about the base of the gland to relax the tissues, and thus remove obstructions of the vascular, lymphatic and nervous structures to the gland. Do not work too much upon the gland itself (commonly once a week or ten days), as it may irritate, but release surrounding edema. Also treat the innervation at the eleventh and twelfth dorsals, fifth lumbar, and first, second and third sacrals. Spreading the ischii will occasionally be beneficial; this tends to release the anterior commissure where it is attached to the symphysis.

Follow the above with a "general treatment" in order to secure a general systemic reaction. This is of value in all infectious disorders.

It is important in **young boys** to examine the condition of the penis in bladder diseases. The prepuce may become adherent or other irritations may be found that are a source of disturbance to the bladder, or even to the kidneys, on account of the intimate connection of the sympathetic system in this region and the relation of one organ to another.

An **irritable bladder** is usually due to disorders of near-by tissues, especially the urethra, vagina, uterus and rectum.

Enuresis, exclusive of paralysis, is frequently due to some local mechanical disturbance. **Nocturnal enuresis** or **bed wetting** is caused by lower dorsal and lumbar lesions (especially the fifth lumbar), displacements of the innominate, or phimosis, hooded clitoris, contracted meatus, highly acid urine, worms, lack of discipline, etc. The patient is usually **neurotic**, which demands attention to the neuromuscular system of the entire body. Care of the general health and habits is important. Constipation may be present.

DISEASES OF THE CIRCULATORY SYSTEM**DISEASES OF THE PERICARDIUM****Pericarditis**

Pericarditis is an inflammation of the serous membrane covering the heart and its reflection in front over the chest. Primary inflammation of the pericardium is rare. Such cases usually result from cold and exposure or injury or tuberculosis, and are most commonly met with in children.

The exciting causes of **secondary pericarditis** are rheumatism, Bright's disease, tuberculosis, gout, diabetes, eruptive fevers, various septic conditions and dyscrasia. Pericarditis may result by extension of inflammation from contiguous organs, as the disease may occur in pneumonia, pleuropneumonia, chronic valvular diseases, and ulcerative diseases of the esophagus, bronchi, vertebræ, ribs, stomach, etc.

Displacement of the ribs over the heart and involvement of the corresponding vertebræ predispose to pericarditis, by weakening the innervation of the pericardium and thus disturbing the circulation. Lesions of the cervical region affecting the left phrenic are to be considered. Upper rib lesions may disturb the internal mammary artery and the lymphatics, which have important relationship with the pericardium. The disease may occur at any age. Males are more frequently attacked than females.

The morbid conditions vary with the stage. The stages are (1) acute, plastic, or dry pericarditis; (2) pericarditis with effusion, sero-fibrinous, hemorrhagic or purulent; (3) absorption or adhesive pericarditis. These different stages or varieties commonly succeed one another, although medical writers place so much importance in them that each is described separately. **Acute pericarditis** is by far the most common and often the inflammation subsides at this point instead of going on to more serious involvement. There is a possibility that in some cases the forms are independent of each other.

The changes are the same as in various serous membranes. Hyperemia and alteration of the epithelium is most marked on the visceral layer. This is followed by an exudation from the hyperemic vessels. There is roughening and loosening of the epithelium and the fibrin is precipitated upon the walls of the pericardium. More or less lymph is exuded and sometimes injected capillaries burst and cause a bloody exudation. From this stage the morbid appearances vary according to the progress of the disease. The disease may undergo resolution and

fatty degeneration and absorption of the products in point take place. As the stage of effusion occurs, the parietal and visceral layers of the pericardium are separated by a serofibrinous exudate. This condition may increase until the quantity of the exudation is considerable, or the effusion may become absorbed. Rarely does the exudate become purulent.

Adhesions may be formed between the layers of the pericardium, during the last stage, by bands of various lengths or the layers are more or less separable.

Symptoms.—Simple cases may not present any symptoms. Usually a chill or cold feeling at the heart, followed by pains in the cardiac region, ushers in the attack. Fever is commonly present, rarely exceeding 103 degrees F. Tenderness over the heart is noticeable. There is dyspnea and the patient is restless.

In the **effusive stage** the symptoms depend largely upon the amount of diffusion. The pain is sharp and stitch-like. Nausea, vomiting and hiccough sometimes occur. The pulse is irregular and feeble. Insomnia, headache and even delirium may occur. Distention of the veins of the neck may cause dysphagia and a cough may be present, owing to the irritation of the trachea. The recurrent laryngeal nerve may be compressed as it winds about the aorta and thus cause aphonia.

The friction sound is a characteristic physical sign of the first stage. In the effusive stage there may be precordial bulging. The area of dullness is enlarged, the diaphragm and liver may be crowded downward, causing an epigastric bulging. As the effusion increases, the heart sounds become less distinct; the friction is not heard. In the **third stage** there is usually a return to normal, although **adhesions** may form and cause precordial retraction and permanently embarrass the heart's movements. The young are more subject to permanent disability. Extension of heart impulse, which is undulatory; diastolic shock to hand placed over heart; increased area of dullness; prominent precordia; position of patient does not change apex beat; and when pericardium is adherent to diaphragm a systolic tug is noted over points of attachment, are essential signs and symptoms.

Diagnosis.—Pericarditis is frequently overlooked. It is a serious disease and one should be especially careful. In cases of rheumatism the osteopath must always be on his guard. Tonsillitis may be the origin of the infection. Care has to be taken in distinguishing between dilatation and cardiac hypertrophy and pericardial effusion. Hydropericardium may be mistaken for pericardial effusion.

To distinguish between endocarditis and pericarditis should not be a difficult task if one understands thoroughly the nature of each disease. A large pericardial effusion may be confounded with a pleural effusion. In doubtful cases utilize the X-ray.

Prognosis.—In mild cases of pericarditis the large majority rapidly recover in two to three weeks. In cachectic subjects and where adhesions have formed, the duration is longer. Relapses may occur. The purulent effusions are always serious.

Treatment.—Demands prompt and effective measures. Absolute rest mentally and physically, is necessary. Too much stress cannot be laid upon this point, as death has occurred from neglect of this. To quiet the heart's action is the first necessary requisite, and then give treatment to limit the inflammation. In the early stage relaxing the upper dorsal musculature to control innervation, and raising and freeing all the upper ribs and clavicles to promote lymphatic drainage is effective. In the second stage prevention of cardiac failure and promotion of absorption are the indications to be met. Too much importance cannot be placed upon the point that general strength, good nursing, dieting and free elimination are essential, not only in securing a rapid subsidence of the inflammation, but to prevent further complications.

Raising and separating the ribs over the heart will be of great aid in lessening the inflammation and promoting absorption. In many cases lesions to the ribs on the left side and subdislocations of the vertebræ affecting the vasomotor nerves, the lymphatics and nerves to the heart will be found. The first five ribs and corresponding vertebræ is the region where one may expect to find the lesions. In addition to absolute rest, an inhibiting treatment in the dorsal region between the scapulæ will aid in slowing the heart's action. Correcting any lesion that may be found to the vagi nerves will also be a help in controlling the heart's action; besides, most of the vasomotor fibers to the heart are in the vagi. These lesions are usually found at the atlas. One should also examine carefully all the cervical vertebræ for derangements that might affect the cervical sympathetic, especially the superior and middle cervical ganglia. These ganglia are primarily affected from the fifth cervical to the first dorsal. Inhibition for a few minutes between the transverse process of the atlas and the occipital bone to the posterior occipital nerves will be of great aid in controlling the tumultuous action of the heart; also, inhibit in the upper dorsal. The warm bath will quiet the heart, but care should be taken not to weaken the patient. The general treatment has the effect of lessening nervousness and quieting the heart.

The function of the phrenic nerve must be borne in mind when regarding the pericardium. The phrenic is usually primarily affected at the third, fourth and fifth cervicals, and occasionally there are connecting fibers as low as the fourth and fifth dorsals. Ice-bags may be found of value in retarding the progress of the effusion and in lessening the heart's action. Liquid food, as milk and broths, should be given throughout the disease. If the effusion is very large the services of a surgeon should be secured and tapping performed. If the effusion is of a purulent nature, a free incision should be made with antiseptic precautions.

In chronic cases carefully graduated breathing exercises and moderate stretching of the adherent regions, if pathology permits, should be considered.

Endocarditis

Endocarditis is an inflammation of the lining membrane of the heart. The process is usually confined to the valves; the lining of the cavity of the heart may also be affected, especially in severe cases. Three forms are recognized: simple acute endocarditis, ulcerative endocarditis, and chronic endocarditis.

Simple Acute Endocarditis.—This form usually results from acute articular rheumatism. Tonsillitis may be associated with endocarditis. It may also be caused by other infectious diseases, especially scarlet fever, but rarely, by typhoid fever, measles, chicken-pox, diphtheria, small-pox and erysipelas. Acute endocarditis is frequently found in chorea. It is also met with in diseases attended with emaciation and general weakness, as cancer, gout, Bright's disease and diabetes. It is not uncommon in phthisis. Micro-organisms play an exciting part, but back of this the osteopath finds lesions of the heart innervation important predisposing features. Prophylactic osteopathic treatment is a potent factor in preventing endocardial changes in the above diseases. Keeping the muscles relaxed and the osseous tissues intact is of great value.

Pathologically, the left side of the heart is most commonly involved. The disease is characterized by the presence of small vegetations on the segments or on the lining membrane of the chambers, although in mild cases there is simply swelling of the valves. The mitral valves are more often affected than the aortic. The vegetations appear, usually, on the auricular surface of the mitral and the ventricular surface of the aortic valves, a little back of the valve edge. Their seat corresponds to the point of maximum contact (Sibson). These growths

are liable to be broken off at any time and carried as emboli by the blood current to distant organs, particularly the brain, spleen and kidneys. This is not uncommon in acute endocarditis or chronic valvulitis. In favorable cases the vegetation is ultimately absorbed and the valve is but slightly altered beyond a simple sclerotic thickening. This is often the starting point of sclerotic valvulitis. Osteopathic measures undoubtedly lessen the liability of cardiac involvement, prevent extensive changes and promote absorption of disease products, by lowering heart tension and improving the cardiac nutrition, as well as increasing free elimination of the toxins in the blood.

During the fetal life, the right side of the heart is most commonly involved. The chorda tendinæ are sometimes affected, but rarely alone.

The vegetations are composed of proliferated connective tissue cells. The superficial elements undergo a coagulation-necrosis and fibrin is deposited from the blood. Micro-organisms are found and are the specific agent in causing acute endocarditis.

Symptoms.—A large number of cases are latent, the autopsy first disclosing the lesion. In many cases there are slight fever, a frequent, sometimes irregular, pulse, palpitation and dyspnea. There is seldom any pain.

Physical signs are very uncertain. They may not be present in mild cases and in those in which the valves are not affected. Usually auscultation furnishes the only indication of endocarditis—a soft, blowing, systolic murmur which is heard most frequently at the apex, as the mitral valves are the ones generally involved. When the aortic valves are affected, the murmur is heard at the second interspace at the right edge of the sternum.

Diagnosis.—This depends entirely upon the etiology and physical signs. The greatest danger is in the disease becoming chronic.

Treatment.—The patient should be kept as quiet as possible, so that the work required of the heart may be reduced to a minimum. The disturbed circulation can be controlled by careful attention to the vasomotor nerves at the various centers along the spine. Attention should be given the disease that is causing the endocarditis. Keep the patient well protected by flannels and beware of damp rooms and sudden changes of temperature.

Treatment should be given to correct any lesion found in the upper five dorsal vertebræ or ribs and to raise and spread all of these ribs so that the heart's action will not be unduly disturbed by interferences with its innervation. The vasomotor nerves to the heart's vessels are found

in the vagi nerves, consequently care should be taken that lesions to these nerves do not exist. An inhibitory treatment to the sub-occipital nerves acts reflexly on the vasomotor nerves and tends to equalize the general vascular system. This treatment quiets the heart's action. Ice applied locally is advocated by many practitioners. Flannels should be placed next to the skin and the ice-bag placed over the flannel. This reduces the fever, lessens the pulse-rate and quiets the heart action. The same points are obtained by the inhibitory treatment at the sub-occipital region. The ice-bag also relieves pain and oppression. Be very careful in the use of ice when there is much cardiac dilatation. Treatment of the middle and inferior cervical regions may have some effect in controlling the heart's action. A general treatment to quiet the patient is effective. Do not allow any overexertion. The patient should have nourishing liquid food.

Emery¹ says: "Many of us have been in the habit of saying, just because we hear a decided murmur in the heart region, that the patient has valvular heart trouble; that the patient has organic heart trouble. This is a common error . . . When there is an anemic condition of the body, apparently the cusps of the valve will be so weakened, and the attachment will be so weakened that the blood will force its way between the valves and back into the heart, causing regurgitation murmur, when as an actual fact there is no deformity and no real disease of the valves, and as soon as the general condition of the anemia is improved, the valve will do its work fully and the murmur entirely cease. So if you have the murmur without the hypertrophied condition, which at once follows such a valvular lesion, you must be guarded in your statements, for if an actual valvular lesion existed, compensation would take place, and it would be the means of corroborating such a valvular condition; if no hypertrophy is found, then we are not justified in definitely stating that a valvular or organic lesion exists, for such a weakened condition as has been mentioned might be the only pathology present, and be the cause of the murmur."

Ulcerative or malignant endocarditis.—This is an acute, infectious or septic disease, characterized locally by necrosis or ulceration of the valve. It is generally a secondary affection to septicemia, pneumonia, erysipelas, scarlet fever and acute rheumatism. Acute endocarditis often precedes the ulcerative variety, the latter being simply an increase in severity of the former.

Etiology and Pathology.—It is doubtful if there can be a primary

1. Journal of the American Osteopathic Association, April, 1906.

form of ulcerative endocarditis. Chronic valvular defects are the most important predisposing causes. Pneumonia is most frequently, of all the acute diseases, associated with severe endocarditis. It is rare in tuberculosis, diphtheria, typhoid fever and chorea. It occurs in association with erysipelas, gonorrhea and rheumatism. Septicemia, pleurisy, meningitis and puerperal fever are other possible causes of ulcerative endocarditis.

Deep seated lesions, which means firmly anchored lateral flexions and rotations due to fibrotic changes, are important predisposing local factors, while other lesions that disturb blood elaboration and resistance and lessen elimination, are predisposing systemic causes.

Pathologically, the lesions are either vegetative, ulcerative or suppurative. The vegetations are composed of granulation tissue, granular and fibrillated fibrin, and colonies of micro-organisms. They become necrotic and break down into ulcers. The ulcerative changes may lead to perforations or produce valvular aneurisms. Of the valves the mitral is the most frequently affected; then the aortic; then the mitral and the aortic together; then the heart walls; then the tricuspid; then the pulmonary. In a few cases the right heart alone is involved. The lesion is not always confined to the valves, but may involve the mural endocardium. The most common organisms found are the pneumococcus, streptococci and staphylococci. The bacillus diphtheriæ, bacillus coli, gonococcus, bacillus anthracis and other organisms have been found. Associated pathological changes include the lesions of the primary disease and the changes due to embolism. The spleen, kidneys, brain, intestines and skin may be the seat of embolism. When found in the lungs, they originate in the right heart.

Symptoms.—If in the course of any of the diseases previously named under etiology, chills followed by fever and sweats occur, ulcerative endocarditis should at once be suspected and a thorough examination be made. The general symptoms are high, irregular fever, delirium, sweating, great prostration, rapid pulse, hurried breathing and sometimes jaundice and diarrhea occur.

The occurrence of delirium, coma or hemiplegia points to involvement of the brain; pain in the region of the spleen, with increased dullness on percussion, point to trouble in that organ; hematuria may occur from involvement of the kidneys. More rarely there will be impaired vision from retinal hemorrhage; and there may be suppuration and sometimes gangrene in various locations, depending upon the position of the embolism.

The **septic type** is secondary to suppurating external wounds, puerperal sepsis or acute necrosis. Occasionally gonorrhea is the cause. The symptoms presented are rigors, irregular fever, sweats and exhaustion—the signs of septic infection. The symptoms may resemble a quotidian or a tertian ague. The **typhoid type** is the most common. The characteristic symptoms are irregular temperature, sweating, prostration, delirium, drowsiness, diarrhea, petechial and other rashes, distention of the abdomen and pain in the right iliac region. The heart symptoms may be overlooked, as in the septic type. The **cardiac type** are cases of chronic valvular diseases in which fever, rigors and sweats, and the symptoms of embolism may develop. In the **cerebral** cases the symptoms may simulate meningitis. Acute delirium may be the distinctive symptom. Heart symptoms may be overlooked.

Physical Signs.—The heart symptoms may be latent. Even after a careful examination, there may be no murmur present. When murmurs are present it is often difficult to locate them.

Diagnosis.—The previous history should be considered and this, together with the symptoms, makes a correct diagnosis possible, even though physical signs are absent. The duration is from a few days to several weeks.

Treatment.—The treatment of this form of endocarditis is likely to be of little avail, although in a few cases where the source of infection can be eradicated the condition may be considerably improved and life prolonged. About the same treatment as in simple endocarditis should be followed. Absolute rest is essential and this, coupled with the local treatment of simple endocarditis and a nourishing liquid diet, constitutes the principal treatment.

Chronic Endocarditis

This condition may begin as a chronic inflammation or follow the acute form, which is more often the case. There is a **sclerosis** of the valves which causes deformity, owing to the contractions. The onset is usually insidious.

It is well known that the larger percentage of valvular lesions are the result of either acute or chronic endocarditis. Thus rheumatism stands foremost as a cause of valvular defects. Alcoholism and overeating (through introducing irritating influences into the blood, or by causing rheumatism, gout and allied diseases) are important etiological considerations. Nephritis and syphilis are considered among the causative factors. Infections and senility, when associated with high blood

pressure, is a phase not to be overlooked. Chronic endarteritis extending from the aorta to the valves, resulting in thickening and degeneration of the tissue, may be an insidious source of valve disease. This is probably often of syphilitic origin.

A potent cause of special interest to the osteopath (for the reason that his treatment is so effective), is continued **muscular strain** as seen in athletes and laborers. The heart muscle itself may be strained, particularly the valve leaflets and the tissues about the valve, which effect often terminates in valvular leakage. In addition, the orifice of the valve openings may become stretched and distorted through strain superinduced by prolonged exertion, by flabbiness of heart tissue, and by dilatation of the ventricles. In these latter cases it is seen that the leaflets of the valves may remain intact, but still they are unable to stretch completely across the opening.

With the above condition it is readily noted that thickening, curling and adhesions will take place when inflammation attacks the valves and contiguous tissues, and following these, limy infiltration and fatty degeneration may be a consequence.

Predisposing osteopathic lesions as noted in acute endocarditis, are not to be neglected.

Thickening and hyperplasia are immediate consequents of connective tissue overgrowth; and especially is chronic endarteritis accompanied with atheromatous and calcareous degeneration. Thickening, at times, is only slight and the function of valves is not impaired.

In curling or **retraction**, there occurs a shrinkage of the hypertrophic or hyperplastic tissues. This condition is very apt to become permanent.

Adhesions of the valve leaflets is a self-evident condition. It is well to note here that in acute and chronic endocarditis some part of the fibrous valve ruptures or is lacerated or eroded from strong and rapid heart action; the **laceration** or rupture or erosion always occurs at the point of maximum contact. Thus the eroded surface allows an opportunity for the rheumatic or septic micro-organisms to lodge, multiply and grow, and adhesions result. Carefully applied osteopathic methods are very efficacious in impending acute heart disturbances, and this without doubt is the reason why so many of our rheumatic cases get well without any heart affections. Keeping the heart quieted and slowed prevents the strong and rapid action and thus lessens the probability of lacerations, ruptures and erosions of the valve tissues. General resistance is

increased and elimination improved, which have a decided effect in preventing complications.

Calcification and atheroma, as has been mentioned, may follow the above diseased processes. The calcification is sometimes so marked as to be of the character of a bony ring.

The question arises here, What effect have **osteopathic lesions** as direct **causative factors** in valvulitis? It appears reasonable that the heart is not exempt from the influences of the vertebral and rib mal-adjustments. Furthermore, clinical experience has abundantly proven that the heart tissues are affected by these lesions in the same manner as any tissue or organ is affected. Again, osteopathic dissection reveals direct nervous connection from the upper dorsal spinal ganglia to the heart ganglia.

No one will question that the integrity of heart function and life are dependent upon normal coronary artery supply, upon vasomotor equilibrium, and upon motor control. All of these functions are influenced by the status of cervical vertebræ, upper dorsal vertebræ, and rib relations. Just what the pathological affection is when these anatomical parts are disturbed is beyond us until more careful dissection and experimentation have taken place. How cervical and dorsal sympathetics, vasomotor and motor nerves with their spinal connections, vagi and phrenic, are so disturbed as to involve valvular parts and induce inflammation, is a problem for us to investigate. Through analagous reasoning from other organic ailments and through the fact that osteopathic therapeutics corrects heart lesions, we know in a general way that the correction of osteopathic lesions decidedly influences the heart.

Two well known **physiological facts** relative to the heart are: first, the heart increases in size up to adult life, and, second, the heart muscle can actually be increased in size. This latter fact occurs in physical development and training. A heart that is weak and flabby can be increased in strength, tone and size. This helps us to understand how certain strains and distortions of the heart, with consequent valvular lesions, may be corrected through rest, exercise and treatment; somewhat analagous to the correction of an atonic, prolapsed and dilated stomach. Then it also seems probable that disturbed innervation and blood supply to heart areas or to the heart as a whole would predispose to congestions, inflammations and degenerations whereby rheumatism, septic states, etc., and muscular strains would act only as exciting causes, not true causes.

No one is going to expect that thickened, retracted, adhered, or

ruptured valves are to be made anatomically correct; but the right treatment will certainly reduce the morbid state to the minimum. Then there are cases where osteopaths have eliminated all murmurs when specialists stated the disease was incurable; showing that it is impossible by signs and symptoms to always diagnose the morbid tissue state. Only the resulting effects of size and of leakage are definitely revealed by auscultation and percussion. Hence there is a class of valvular diseases that can be successfully treated by osteopathic measures, which, if left to terminate under drug medication, will reveal (at post-mortem) the pathological signs of valvular heart disease.

Downward displacement of the **first rib** may interfere directly with the subclavian artery and thus cause constriction of that vessel and a consequent regurgitation; also, cardiac fibers of the recurrent laryngeal nerves may be impinged by a dislocation of this rib. Many lesions which interfere with the right side of the heart occur at the **second** and **third ribs** and lesions of the **third, fourth** and **fifth ribs** may interfere with the valves. Lesions of the **corresponding vertebrae** produce the same results as the ribs. These lesions are probably to the sympathetic nerves along the dorsal region. Lesions may be found anywhere along the cervical vertebrae which may involve inhibitory (vagi) fibers or accelerator (sympathetic) fibers to the heart. Also, in some cases the **floating ribs** are dislocated downward and cause a prolapse of the diaphragm, and thus a constriction of the aorta, which may result in regurgitation and valvular disorder.

Mitral Regurgitation.—Mitral regurgitation is a leakage of blood from the left ventricle; through the mitral valves, into the left auricle. The opening of the valve may be distorted, or the valve leaflets thickened, rigid, or retracted, thus allowing an escape or reflux of blood from ventricle into auricle. The tendinous cords may also be thickened and adhered, with consequent prevention of free action.

By a forcing back of a portion of the blood from ventricle to auricle at the same time the pulmonic veins are emptying into the auricle, an overdistention of the auricle takes place. The auricle, then, from the extra amount of work required, becomes hypertrophied and dilated. There may be no noticeable symptoms at first. Later on shortness of breath, cough, irregularity of heart's action, indigestion, liver congestion, and so on, occur.

The **apex beat** is forcible and downward to the left. Of course the area of dullness is to the right and left. There is a **systolic murmur** in the mitral area, which is transmitted to the left axilla.

Every osteopath should understand the mechanism of this most frequent valvular lesion. Following hypertrophy and dilatation of the left auricle, the reflux may be so excessive that a residue remains. The auricle not being able to handle all the blood, **stasis** of the pulmonary vessels takes place, and pulmonary edema and hydrothorax are sequelæ. Then comes dilatation of the right ventricle and back pressure on tricuspid valves and right auricle. The **veins** throughout the body become turgescient, and the liver is apt to be indurated. It should be emphasized, however, that "back pressure" is only an effect commonly due to myocardial degeneration, caused by some infection, of which auricular fibrillation is an important part of the pathology.

Before the breaking down of the left heart compensation, osteopathic methods, as all know, are effective in maintaining balance. Even after the lungs begin to be affected, careful and thorough treatment will result in good, and in cases of general venous sluggishness treatment, particularly to liver, diaphragm, bowels and limbs, will generally materially help in slowing the downward course of the disease.

Mitral Stenosis.—In stenosis there is narrowing or constriction of the valve opening. Thus in mitral stenosis the free flow of the blood from left auricle to ventricle is hindered.

The **cusps** are usually thickened, rigid and adhered. The valve opening may be so stenosed as to be but a narrow slit. In all cases stenosis is a **structural defect**. It can occur by strains, as regurgitative effects sometimes result.

The **symptoms** of mitral stenosis are practically the same as those of mitral regurgitation, owing to similar effects upon the circulation.

Under **physical signs** we find the apex-beat is only slightly displaced. Palpation will reveal, near the apex, a rough presystolic thrill. The increased area of dullness is to the right. There is an abruptly terminating, rough, presystolic murmur.

Aortic Regurgitation.—Aortic regurgitation is a reflux of blood from aorta to left ventricle, following ventricular systole. This is considered the **most serious** of the valvular diseases. The valve opening is either too large, so the valve leaflets do not fit tightly, or the segments themselves are thickened and retracted. Structural defects of the aortic valves are largely of the same character as in diseases of the mitral valves.

The **regurgitation** first causes dilatation of the left ventricle. This is followed by hypertrophy. If the mitral valve holds intact, no further effects result. But if the mitral valve is diseased or becomes incompe-

tent from the dilated ventricle, the same morbid states follow as was noted under mitral regurgitation.

There is a forcible apex-beat, displaced downward to the left. The increased dullness is to the left. There is a long, loud **diastolic murmur**. The well known "water-hammer" pulse is felt.

Aortic Stenosis.—Aortic stenosis indicates a narrowing of the aortic orifice. It is a structural defect. The free flow of blood is obstructed from the left ventricle into the aorta.

Aortic stenosis is much less frequent than regurgitation. Aortic stenosis and regurgitation are very apt to be associated. The beat is commonly forcible, and the increased area of dullness is to the left. There is a systolic murmur, heard best at the right second interspace, which is conducted into both carotid arteries.

Tricuspid Regurgitation.—Tricuspid regurgitation is the most common valvular lesion affecting the right heart. It is rare as a primary lesion. The affection may be of a structural character, or functional.

Hypertrophy of the right ventricle occurs after the manner of left ventricle hypertrophy in mitral regurgitation. The sequelæ of venous turgescence follow, also, in the same way as was given under the mitral lesions. Tricuspid regurgitation rarely exists independent of some other cardiac or pulmonary ailments.

The apex-beat is diffused toward the epigastrium. Increased cardiac dullness is toward the right. There is a systolic murmur, which is heard best just above the xiphoid cartilage. The jugular vein pulsates; in severe cases there is pulsation of the liver.

Osteopathic treatment is usually effective in relieving the engorgement of the veins, and particularly in reducing liver congestion.

Tricuspid Stenosis.—This affection is said to be the **most rare** of valvular lesions. Thickening, obstruction and adhesions from endocarditis cause the stenosis. As in other lesions of the heart, there is a congenital form. There is pre-systolic murmur, heard best at the xiphoid cartilage. The pulse is small and weak.

Pulmonary Regurgitation.—This is another rare lesion, and is seldom met with in a simple form.

There is forcible pulsation in the epigastrium. Increased cardiac dullness is downward. There is a diastolic murmur, heard most distinctly at the left second intercostal space.

Pulmonary Stenosis.—Another rare lesion. The effect of this lesion on the right ventricle is the same as that of aortic stenosis on the

left. The congenital lesion is apt to occur with a patulous foramen ovale.

There is a systolic murmur, heard best at the second intercostal space on the left. **Many systolic murmurs** heard over the pulmonary opening **are functional**.

Combined Valvular Lesions.—When two or more lesions occur at the same time the terms, combined or associated, are employed. This is a very common occurrence. Two, three or all of the valves may be affected at the same time. **Stenosis** and **regurgitation** at the same orifice is the most common association of any two valvular lesions. When there is a joint affection of two or more valves, the **aortic** and **mitral** are most commonly associated; then mitral and tricuspid; then aortic, mitral and tricuspid.

Prognosis and Treatment of Valvular Diseases.—It is impossible to outline with exactness either prognosis or treatment of heart lesions. All will agree that the character of the lesion is the first consideration, and before records of these cases can be of any scientific benefit, we must look well to the nature of the valvular leakage or obstruction and note precisely what effect our therapeutics has. Perhaps of greatest consideration in the matter of prognosis is, to what extent **compensation** has been maintained. We know that compensation may be perfect; that hypertrophy and dilatation may balance the valvular defect so thoroughly that even the patient is not aware of a heart lesion. As soon as compensation begins to fail, when palpitation, irregularity of pulse, dyspnea, edema, etc., appear, we know that our treatment should pass from the realm of the defensive to that of the offensive. Then when compensation fails still more, prognosis and treatment must necessarily be changed according to the increasing gravity.

In our osteopathic work we should never forget that the condition of the lesion may be greatly influenced by environment. Habits, occupation and general daily life may affect the heart ailment for good or bad. Thus in **prognosis** we have **three features** in particular to note: character of heart lesion, extent of systemic involvement, and environment. In the immediate prognosis, the extent of general venous stasis, if any, is of great importance. In other words, the gravity of the complications is of first consideration.

Aortic regurgitation is ranked by heart specialists as the most serious lesion. Aortic stenosis is a grave lesion, but not so serious as aortic regurgitation. It is often stated that the character of the lesion is not of so much consequence as the extent of involvement the lesion has en-

gendered. Mitral stenosis is more grave than mitral regurgitation. Right side heart lesions are usually relative, and, naturally, when the right heart is diseased from extension of the ailment from the left side, the situation is serious.

It should be remembered that a heart normal in size and beating regularly is usually in a fairly healthy condition even if a murmur is present.

In our **treatment** the first point indicated is to improve, if possible, the **integrity of heart muscle** and **lessen the valvular defects**, if such can be done. Owing to a dearth of statistics, it is impossible to state to what extent improvement in organic lesions has been accomplished. Very likely if we had statistics and no post-mortem findings, we would still be in the dark as to much of our work. This much is positive: osteopaths have time and again apparently cured grave valvular lesions; cases that eminent specialists diagnosed as absolutely organic lesions. Our practitioners have eliminated the murmurs, reduced the size of the heart, and removed any and all systemic symptoms. These patients are well, have been well for years, and are leading active lives. But were these cases suffering from organic lesions? No doubt there was valvular leakage, hypertrophy and dilatation, but was the valve defect a functional one? In other words, was it due to strain and distortion? In all probability the patients' days were numbered and post-mortems would have shown grave lesions and quite likely more or less organic changes.

Does it not seem likely that some functional lesions may terminate in organic lesions? Through continued stretching of the valves and their immediate tissues, fatty degeneration may take place; the same as fatty degeneration of the heart muscle, occurring in dilatation of the chambers. If we can remedy functional lesions through specific work upon nerve centers and fibers, why cannot we influence organic lesions and at least reduce the gravity to a minimum? We know functional diseases of the heart, as palpitation, rapid heart, slow heart, etc., can be corrected, and from all indications, functional valvular leakages are generally easily and quickly remedied; it is only a step farther to affect truly organic lesions. The same valves, the same nerves, and the same osteopathic lesions are noted. Then it is only a continuation of the same process from functional disease to organic disease. Indeed, no one is able to draw a line between the two. Probably, as was intimated before, careful osteopathic treatment in rheumatism and other diseases that are apt to predispose to heart affections, will keep the heart so strong functionally

and organically that resulting valvular lesions are not nearly so likely to develop. The heart can be treated and controlled as can any tissue or organ. It certainly stands to reason that osteopathic therapeutics is rational in both preventing and curing valvular lesions. The M. D. gives his drugs with the hope of maintaining heart muscle integrity, of lessening a too forceful beat, of increasing waning power, of promoting general circulation, of preventing and lessening complications. We can do the same thing with our methods, even more effectually, and with no probability of harmful effects.

It would appear there are at least two ways in which organic lesions may develop. **First**, as stated above, through **functional distortion**, the normal heart muscle being strained from severe exercise, or a weak, flabby, or disused heart muscle being overtaxed by ordinary exercise. Here it will be seen that in the first instance immediate rest will probably correct the weakness; in the second, rest and general building up of the body if the atonic heart muscle resulted from some debilitating disease. If from local causes correction of the specific osteopathic lesion should be effective.

Secondly, through strong and rapid heart action the **valves** are **ruptured or lacerated**, always at the point of **maximum contact**, and thus present a favorable surface to micro-organisms.

Owing to the valves being a reduplication of the endocardium, they have no muscles or blood-vessels, so that in **functional leakages**, inflammation does not play a part, hence, a possibility of degeneration occurring from excessive stretching.

The large majority of **osteopathic lesions** are unquestionably found in the upper five dorsal vertebræ and the first five or six ribs on the left side, although cervical lesions, in many instances, play an important secondary, if not the primary, role. These mal-adjustments affect vasomotor nerves to the heart, that is, to coronary vessels, the dorsal and cervical sympathetics, the vagi, and the phrenic. We are unable to state just how these lesions disturb nerve conductivity; what present anatomy and physiology teach us does not fully explain. Osteopathic dissection must be the means to the end of the explanation. We have many clinical results, but not the physiological knowledge, as yet, to support it.

The dropping down of the first rib, as well as the clavicle, interferes with the large blood-vessels, especially the subclavian, and causes increased resistance of the heart's action and probably a certain regurgitative effect. This regurgitative effect would also occur in cases of ob-

struction to the aorta by constriction of the diaphragm from dropping of the floating ribs. To what extent this latter feature has been demonstrated is not known. In valvular diseases it is practical to divide them for treatment into, **first**, where the **lesion** is **compensated**; **second**, where **compensation** is **incomplete**; **third**, where **compensation** is **lost**. With all cases we should give consideration to environment, temperament, habits, food, clothing, exercise, etc. Often these secondary matters are of vital importance, especially when compensation is failing. The Schott method of treatment may be of some avail; this treatment, which is composed of a series of resistant exercises, tends to lessen peripheral resistance, develop heart muscle, and remove heart stasis.

Speaking in general, **hypertrophy** and **dilatation** follow valvular leakage, as a **secondary effect**. It is a compensatory condition, and whenever compensation is failing, there is naturally a breaking down of the structural tissues of the heart; that is, the muscular hypertrophy is losing in integrity. Our primary aim, then, should be to keep up the compensation, which is represented in the hypertrophy, although there are cases that fail rapidly, especially in emphysema and cirrhosis of the lungs. Generally, in hypertrophy and dilatation, there is a **disproportion between the amount of work the heart has to do** and its **ability** to do it. One of two things has occurred; there is an increase in peripheral resistance or the volume of blood through the heart is abnormal in quantity¹. Loudon² says: "The treatment of chronic disease of the heart requires a longer time, as a rule, than the same disorder in the acute stage. Some cases cannot be materially helped; a vast majority may be greatly benefited after a thorough trial; while more than we might at first suppose, can be entirely cured. We desire to quote at length from Hare relating to this point. He says: 'A chronic structural change in the heart resulting from an acute process is not always synonymous with chronic heart disease. Thus, acute endocarditis occasions a variety of changes of the mitral and aortic valves which long may indicate their presence by their characteristic murmurs, and yet in time these may wholly disappear. That many such cases outgrow the valvular trouble, especially mitral lesions, there can now be no doubt. The majority, even of those in whom valvular murmurs permanently continue, do not have their health unfavorably affected for years, and in many of these, the duration of life is not appreciably shortened.'" This statement, from such an author, gives the osteopath great encouragement; for add

1. Valvular Heart Diseases, A. O. A. Journal, March, 1905.

2. Journal of Osteopathy, February, 1904.

to those above referred to, which recover in time from all valvular trouble, the many cases of valvular insufficiency, due to dilatation, owing to osteopathic lesions to the trophic nerves, and which may be cured by removing such lesions, we find that quite a percentage of cases are thus disposed of.

"It is doubtless true, also, that the cases above mentioned having valvular thickening and vegetations, could have been cured in quicker time and greater number had osteopathic treatment been given to tone the heart, upbuild the general circulation and increase the activities of the excretory organs. The importance of the lungs is often overlooked in the treatment of cardiac diseases. The osteopath's ability to expand the chest and increase the capacity of the thorax should be demonstrated in both cardiac and pulmonary troubles. It is said to be a universal law throughout the animal kingdom 'that muscular power is directly proportional to the amount of oxygen consumed.' Hence give the power, and have your patient live as much out of doors as practicable. **Exercise** should be **moderate** and always **stopped** short of **fatigue**."

Treatment of the abdominal organs should not be neglected, for improved circulation here and thorough removal of effete products will influence the heart. Freedom from worry, strains, etc. are essential. Tepid baths are best.

A person may have a valvular leakage and not be aware of it. Probably it is best to inform them, except in certain neurotic individuals. For then they can take special care of themselves, as to overwork, strains and intercurrent infections, and their life and usefulness be greatly prolonged.

When compensation begins to break, certain symptoms are noticed, as heart irregularity, difficult breathing, particularly at night, shortness of breath, and more or less anemia. Later there is disturbance of rhythm, cyanosis, dilatation of heart and dropsy. Frequently, considerable can be accomplished through the upper dorsal treatment, attention to the chest mobility, manipulation of the abdominal organs and diaphragm, and special attention to the diet, rest and some exercise. A light general treatment will assist the labored circulation and improve assimilation, and a change of climate may be of benefit.

Hypertrophy of the Heart

Hypertrophy of the heart is an enlargement of the heart, due to an increase in the muscular tissue. It is usually associated with dilatation. The ventricles are more often involved than the auricles, and the left ventricle is more likely to be affected.

Etiology.—Valvular disease of the heart causing an obstruction to the outflow of blood, as mitral insufficiency, diseases of the aortic valve; increased intra-vascular pressure, caused by sclerotic changes in the walls of the vessels; contraction of smaller arteries, due to irritation of toxic substances in the blood, as in Bright's disease. Overeating or drinking and excessive physical exercise would also induce hypertrophy of the left ventricle. Hypertrophy of the right ventricle is caused by valvular lesions on the right side. Lesions of the mitral valve causing an increased resistance in the pulmonary vessels are etiologic factors; also diseases of the pulmonary vessels in the lungs, as in cirrhosis and emphysema. There are conditions affecting the heart, as the use of tea, alcohol and tobacco. Disturbed innervation, as in exophthalmic goiter; derangements of the vertebræ, and ribs corresponding to the upper five dorsals; downward displacements of the floating ribs, causing a prolapse of the diaphragm and a consequent retardation of blood through it to and from the heart, will affect the heart's action. Simple hypertrophy never occurs in the auricles; it is always accompanied with dilatation. The condition develops in the left auricle in mitral lesions; in the right auricle when there are disturbances of the pulmonary circulation. The tricuspid is rarely affected primarily.

Pathologically, the left side of the heart is more commonly enlarged than the right; the ventricles than the auricles. The shape of the heart varies when the left ventricle is hypertrophied, the conical shape being more or less lost; it lies more horizontally and is elongated. When both ventricles are enlarged the heart is round. When the right ventricle is affected, it occupies the largest part of the apex. The increase in the size of the heart is probably due to a numerical increase in the muscle cells. The muscle is firm, of deep red color and cuts with considerable resistance. Normally, the heart weighs from eight to nine ounces. In general hypertrophy it may weigh from fifteen to thirty ounces.

Symptoms.—Hypertrophy, being a conservative process or an act of **compensation**, does not necessarily present any symptoms at first. At the beginning there is rarely any pain, but a sense of fullness and discomfort is present. As the hypertrophy increases, the arteries become fuller, the veins less full and the circulation accelerated. In hypertrophy associated with arteriosclerosis the blood pressure is increased, and the pulse full and firm. Epistaxis may be of frequent occurrence and the face congested. Pains occur in the precordial region. There are nervousness, headache, hot flushes, palpitation, cough and vertigo.

In hypertrophy of the **left ventricle**, the apex is lower and to the left. The carotids pulsate visibly and the radial pulse is strong and tense. Percussion reveals enlargement to the left and downward. The first sound is louder and prolonged. The aortic second sound is intensified. In hypertrophy of the **right ventricle** the enlargement is to the right edge of the sternum. The second sound in the pulmonary area is increased. The apex-beat is displaced outward. The pulse at the wrist is usually small. Hypertrophy of the **auricles** always occurs with dilatation, which is most common in the left auricle. The physical signs are characteristic. They are caused by diseases of the mitral and tricuspid valves and diseases of the lungs, as emphysema and cirrhosis.

Diagnosis.—If a careful examination is made, hypertrophy can hardly be mistaken for any other condition. There may be a resemblance to pericardial effusion, pleuritic effusion, aneurism or mediastinal tumor, when near the heart. The X-ray will be of assistance.

Prognosis.—Depends largely upon the cause producing the hypertrophy. Remember that hypertrophy is a compensatory act. The prognosis is more or less unfavorable if resulting from emphysema, Bright's disease or in old age; also in degeneration of the vessels. In most cases of functional overaction, persistent treatment can usually accomplish considerable.

Treatment.—The treatment must be according to the cause of the hypertrophy. There are many etiological factors, consequently the treatment depends upon the influence of these factors. The principal treatment will be found under endocarditis, as valvular diseases are usually caused by endocarditis, and hypertrophy of the heart is a conservative process of nature—an act of compensation secondary to valvular and arterial lesions. The indications are to lessen the force and number of pulsations of the heart and remove the cause if possible.

Dilatation of the Heart

There may be **dilatation** with thickening of the walls, and dilatation with thinning of the walls, or they may be normal. It may be produced by impaired nutrition of the cardiac muscle or increased endocardial tension. More frequently the two conditions act jointly, although they may act singly. Impaired nutrition of the cardiac muscle may diminish the resisting power and thus cause dilatation. Weakening of the cardiac walls may occur in scarlatina, typhoid, typhus, rheumatic fever, etc. It is met with in chlorosis, anemia and leukemia. Increased endocardial tension occurs in sudden, extreme exertions and in valvular dis-

eases. A normal heart through excessive exertion is rarely if ever dilated. The important causes are considered under hypertrophy. Both impaired nutrition and increased endocardial tension are influenced directly by the extent and severity of the osteopathic lesion. This point has been considered under chronic endocarditis.

Pathologically, the right side is more commonly affected than the left. In advanced aortic incompetency, all the divisions may be dilated. When one ventricle alone is dilated the septum may be seen to bulge. In extensive dilatation, the auriculo-ventricular rings are often dilated. Other orifices may also be dilated. The condition is often associated with **hypertrophy** and **fatty degeneration**. The muscle may be normal in appearance. The endocardium is often opaque, and roughened in patches. There is degeneration of the ganglia of the heart.

Symptoms.—Dilatation causes weakness of the walls of the heart, but as long as the hypertrophied walls can compensate, no symptoms result. When the hypertrophy weakens, greater dilatation occurs and symptoms of venous stasis appear, as dropsy, feeble irregular pulse, dyspnea, cough and scanty urine. In some instances there may be brief precordial distress, faintness or palpitation.

Physical Signs.—On **inspection** the apex-beat is diffuse and feeble, or it may not exist. As observed by Walsh, the impulse may be visible and yet not palpable. **Palpation**—the impulse is diffuse, feeble and fluttering. The pulse is small, rapid and irregular, rarely is it slow. **Percussion**—the area of lateral dullness is increased to the right. There is increase in the dullness downward to the sixth interspace and upward to the second rib in many cases. **Auscultation**—the sounds are weak and sharp. The first sound is shorter, lacks its muscular element and becomes more like the second. The sounds are obscured, the cardiac murmurs are present. In many cases the characteristic gallop rhythm is present. When the right heart is chiefly dilated, the true apex-beat cannot be felt, while an impulse may be felt below the xiphoid cartilage, and a wavy impulse is seen in the fourth, fifth and sixth interspaces to the left of the sternum.

Diagnosis.—When a clear history can be obtained, together with the characteristic features, the diagnosis can be readily made. **Prognosis** depends upon the cause.

Treatment.—The treatment of dilatation is that of valvular heart disease. It is important that the patient should have plenty of rest, suitable food and regulated exercises.

In acute dilatation absolute rest is necessary. Limit the fluid intake, and open the bowels thoroughly. In serious cases, bleeding, a pint or more, should be considered.

Myocarditis

Myocarditis is an acute or chronic inflammation of the heart muscle. In many cases where the muscle substance of the heart is diseased, there is no doubt that **osteopathic lesions** are potent underlying factors. The lesions lessen nervous integrity and thus have a direct bearing upon the muscular strength and the likelihood of inflammatory invasion.

Acute Interstitial Myocarditis.—This affection is met with in fevers, in connection with endocarditis and pericarditis. Of the infections diphtheria and typhoid are the most frequent. Septic emboli may block the coronary arteries in pyemia, septicemia and malignant endocarditis and cause infarcts in the myocardium with abscess formation. It may be a complication of gonorrhea. Males are affected more often than females.

Pathologically, in acute interstitial myocarditis the changes take place in the intermuscular connective tissue. This becomes swollen and round-cell infiltration takes place. The muscle substance is pale and soft. **Acute parenchymatous degeneration** is characterized by degeneration of the muscle fibers, which are infiltrated with granules. The cardiac muscle throughout is pale and soft. **Acute suppurative myocarditis** is a rare condition. In this form abscesses occur, which vary in size from a pin's head to a pea. They vary greatly in number and are usually multiple. They may not cause any disturbance and may not be recognized before death. On the other hand the abscess may rupture into the heart cavities or the pericardium, or it may perforate the intraventricular septum, thus allowing the venous and arterial blood to intermingle. It may cause a cardiac aneurism.

Symptoms.—These are very uncertain. If during the course of any of the causal diseases, the pulse suddenly becomes rapid, small and irregular and compressible and palpitation and syncope develop, all of which point to cardiac weakness, myocarditis may be suspected. Signs of venous stasis develop later in the affection. The physical signs are those of dilatation. This is extremely grave. Cases do, however, recover.

Treatment.—The treatment is the same as that given under endocarditis and pericarditis. Rest in bed is absolutely necessary. Pay

particular attention to the nourishment and to the hygienic surroundings of the patient. Especially attention should be given to the upper dorsal area, both to the muscles and the interosseous lesions, for this influences cardiac muscle innervation and nutrition. Then lesions of the upper cervical are important owing to their relationship to the vagi which control muscular impulses of the heart muscle.

Chronic Interstitial Myocarditis.—Among the causes of this form of myocarditis are the excessive use of tobacco or alcohol; gout, rheumatism, malaria, diabetes, chronic nephritis, syphilis and lead poisoning. Acute interstitial myocarditis may lead to the chronic form. This form is “commonly caused by the narrowing of a coronary branch in a process of obliterative endarteritis” (Osler). It may be due to injuries of the anterior and lateral portions of the chest. Unquestionably **osteopathic lesions** of the upper dorsal vertebræ and ribs and cervical region affect the integrity of the heart muscle and predispose to congestion, inflammation and debility of the tissue. Males of middle life are more predisposed to chronic myocarditis.

The **pathological changes** occur most frequently in the left ventricle and the septum, but they may occur in any portion. The patches and streaks that are in the walls are sometimes only seen upon very careful examination. They are of a gray or grayish white color, and when fibers that have undergone fatty degeneration are intermingled, they have a grayish yellow tint. The condition may be associated with hypertrophy and dilatation. A part of one of the heart cavities may become dilated, producing what is known as cardiac aneurism. There is destruction of the muscular fasciculi with subsequent development of new fibrous tissue. Fatty degeneration is also seen.

Symptoms.—Advanced fibroid myocarditis may be present without any symptoms. Slight degrees present no symptoms. The symptoms when present are: a feeble, irregular, slow pulse; attacks of angina pectoris and sometimes arrhythmia. The blood pressure is increased. Upon exercising there is more or less pain, cardiac distress and dyspnea. If fatty degeneration is also present the pulse will be quickened and irregular.

Diagnosis.—This is often very difficult and it requires careful and persistent study of a case to be able to make a correct diagnosis.

Prognosis.—This is grave, though unquestionably a number of cases have been distinctly improved through osteopathic methods. Sudden death is liable to occur at any time from complete obstruction to the

coronary arteries, as this condition is associated with sclerosis and narrowing of these arteries or their branches.

Treatment.—The treatment of chronic myocarditis is largely included in chronic endocarditis. The cause of the disease should be determined, if possible. Careful treatment to the ribs of the left side, from the first to the sixth, and the corresponding vertebræ, will be of great aid in controlling the disease. The cervical region demands attention, owing to the influence of the vagi on conduction of the heart impulse and to vasomotor effect. Attention should be given to the diet and hygiene of the patient. Outdoor life, bathing of the skin, and careful treatment of the vasomotor nerves will be of great help.

Direct attention to the entire splanchnic region as vasomotor control here materially lessens the work of the heart and assists generally in maintaining the digestive and nutritive functions.

Degeneration of the Heart Muscle

In fatty degeneration, the sarcous substance of the fasciculi is converted into fat. In fatty overgrowths there is an excess of fat in and about the heart.

Fatty degeneration is very common and is due to an interference with the nutrition of the cardiac muscles. It is found in the impaired nutrition of old age, of cachectic states, of grave infectious diseases and of wasting diseases. In poisoning by arsenic and phosphorus, intense fatty degeneration is produced. Pericarditis may be associated with changes in the superficial layers of the cardiac muscle. Lesions of the coronary arteries will produce this condition; also impairment of the oxygen-carrying power of the blood. It occurs most frequently in men after forty years of age. The affection may be either general or local. It is most commonly seen in the left ventricle. When the condition is general the heart is dilated, flabby and relaxed. Microscopically, the muscular fasciculi exhibit a loss of nuclei, and oil drops and granules appear in the fibers. The affection may be present without any noticeable symptoms. Slight degrees and localized fatty degeneration are unrecognizable. **Dilatation** must be present to produce **symptoms**. This is apt to occur early. Dyspnea; asthma; cough; angina pectoris; dropsy; slow, weak pulse; palpitation, and toward the end, Cheyne-Stokes breathing may appear. Mental symptoms, such as maniacal delusions, may come on and last for weeks. **Prognosis** depends upon the cause and extent of involvement.

The **treatment** is largely that of dilatation of the heart. An ef-

fort must be made to determine the cause, and treatment should be applied accordingly. Considerable can be done in improving the nutrition of the tissues of the heart by hygienic and dietetic measures. Light exercises will often be of aid, but care has to be taken that the exercises do not tax the patient too severely. A general treatment of the body will be a helpful measure in invigorating the system as a whole and toning the cardiac tissues. The diet should be nutritious; largely nitrogenous.

Raising the ribs over the heart and increasing the chest expansion will be of help in cases where there are attacks of dyspnea and angina. Many cases present deep seated lesions in the upper dorsal region. When there are attacks simulating apoplexy, lay the patient flat upon the back with the head slightly elevated.

Fatty overgrowth is associated with general **obesity** and sooner or later this infiltration impairs the nutrition of the cardiac muscle and true fatty degeneration results. This form occurs more frequently in men, and between the ages of forty and seventy years. The characteristic changes consist of an increase in the normal fat. The heart may be enclosed in a thick covering of fat. The fat may also be deposited between the fasciculi, sometimes reaching the endocardium. Fatty overgrowth is certain to exist in extreme obesity. No **symptoms** are produced until the muscular fibers weaken so that **dilatation** occurs. The presence of extreme obesity, combined with signs of cardiac weakness, point to fatty overgrowth. The **treatment** of fatty overgrowth of the heart is largely the same as that of obesity. Oertel's method of lessening the amount of liquids, proteid diet and graduated exercises is effective in cases where heart compensation is intact.

Neuroses of the Heart

Palpitation is a more or less rapid action of the heart, of which the patient is conscious. There is usually an irregular or forcible action of the heart, as well as a frequency of the heart-beat. There is generally some local irritation to the cardiac nerves; especially are **lesions** found to the third and fourth ribs, although a lesion may be higher or lower in the dorsals or it may be in the cervical area. Muscular lesions are frequent. These lesions predispose to the disturbances of reflex stimuli, still the general health may be so weakened or the reflex irritation so pronounced that palpitation results independently of predisposing osteopathic lesions. Females are more liable to be affected. The neurotic state is a common source of the disorder. If palpitation is long continued

it causes hypertrophy. It often occurs at puberty, during menstruation and at the climacteric period. Anemia, the acute infectious diseases, dyspepsia, disturbances of the ovaries and other pelvic organs are common causes. The abuse of coffee, tea, alcohol, tobacco; diseases of the stomach, overwork, fright, grief, anxiety, and sexual excesses are causative factors. Palpitation may be associated with organic diseases of the heart, but as a rule it is a purely nervous affection.

The patient's perception of the increased action and force of the heart is the **essential element** in palpitation. The action of the heart varies greatly and at times it may be a mere fluttering which lasts but a few minutes. In severe cases the heart beats violently and the pulse may be rapidly increased and reach 160 or more. The face is usually pale, but may be flushed. The heart's action is not increased in some cases. The attack generally lasts only a few minutes.

The first consideration in **treatment** is to locate the disturbing factor. Raising the ribs over the heart and lowering the first rib; correcting the clavicle in a few instances, or inhibiting along the upper dorsal region will usually quiet the heart's action. Stimulation of the vagi nerves, as they pass along the side of the neck, may be all that is necessary; in some cases inhibition of the superior cervical sympathetic or of the middle cervical region, acting on the depressor nerve of the heart, will lessen the tumultuous action of the heart. It will be recalled that either there is irritation of the accelerator nerves of the heart or the vagus is inhibited.

All **reflex disturbances**, as a displaced uterus, indigestion, etc., must be removed before the palpitation can be permanently stopped. Rest and confidence in the treatment are of great importance. A very few cases will require a hot bath and a general treatment and possibly an ice-bag over the heart to quiet the increased activity. In **anemic cases** hygienic measures and a proper diet, coupled with the treatment for anemia, are indicated. If the attack is severe, the patient should rest in a recumbent posture and drink something warm, besides receiving the indicated treatment. When the patient is not a decided neurasthenic a rapid five or ten minute walk will often normalize the heart's action.

Tachycardia is rapid action of the heart and commonly occurs in paroxysms. There are no heart sensations, as in palpitation. Either the sympathetics are stimulated or the vagus inhibited. It is not generally related to lesions of the heart, but is in reality a **disorder** of the **nervous system**. In some instances the condition is physiologic.

Nervous strain, in the form of **osteopathic lesions** to the upper dorsal or cervicals irritating the sympathetic, is the most common cause. Emotion, fright and severe exercise are other causes. It is found in neurasthenia, anemia, hysteria and in those using an excessive amount of tobacco, tea and coffee. **Reflex stimuli** from abdominal or pelvic disorder, especially during the climacteric may induce tachycardia. In exophthalmic goitre the sympathetics are overstimulated, and in some instances the vagus inhibited, leading to "heart hurry." Tumors, hemorrhages, enlarged glands, etc., obstructing the action of the vagus, are a source of rapid heart.

Sudden onset with rapid action of the heart, small weak pulse, headache, flushed face and faintness are common **symptoms**.

The **treatment** is somewhat similar to that outlined under palpitation. Locating the cause is the first essential. Besides removing local osteopathic lesions, inhibition to the cervical and dorsal sympathetics is effective. Raising the ribs over the heart will lessen the pulse-rate.

Rest, diet and general care of the patient may be necessary. Outdoor exercise and cold bathing are beneficial. In a few cases springing the dorsal spine forward, raising the floating ribs, and slight traction of the cervical spine are effective in slowing the heart's activity. A few cases are very refractory, especially in neurotics.

Brachycardia, or slow action of the heart, is the opposite of tachycardia. In a few cases it is physiologic. It usually occurs secondarily, following infectious diseases; accompanying nervous disorders, as hysteria, melancholia and neurasthenia, and is associated with diseases of the digestive organs, pulmonary disorders and toxic effects of coffee, tea, tobacco, and drugs and the toxins of jaundice, diabetes, uremia, etc. Obstructions to the cervical sympathetics and irritations of the vagus, from osteopathic lesions, may be either direct causes in themselves or predisposing factors in the above diseases.

A **slow, weak pulse** is the characteristic symptom. The heart sounds are feeble. When the pulse beat is below sixty per minute it is diagnostic.

In the **treatment** of slow heart, as in the other neuroses of the heart, the cause should be first determined. A stimulating treatment to the cervical sympathetics and inhibition to the pneumogastric will readily relieve many cases, at least temporarily. The lesion may be directly to these nerves and of course removal of the same is essential. Inhibition of the pneumogastric probably affects the activity of the depressor nerve, and stimulation of the cervical sympathetics, besides acting on the ac-

celerator fibers of the heart directly, influences the blood supply of the body and thus increases arterial tension. Stimulation to the upper chest anteriorly and posteriorly, over the cardiac region, will increase the rapidity of the slow heart. Rest and care of the general health is necessary.

Arrhythmia, or an irregularity of the heart's action and pulse beat, often due to lesions in the cervical region interfering with the vagi, sympathetic or vasomotor nerves to the heart. In a number of cases the first, second or third rib on the left side is at fault and a correction of it will relieve the irregularity immediately. It is claimed that there are nerves at the fourth and fifth dorsals that tend to control the rhythm of the heart-beat. Other causes are organic diseases of the heart and nervous system, reflex disturbances, excessive use of tobacco, coffee and tea.

"Normally, the contraction of the heart originates at the sinoauricular node, at the mouth of the superior vena cava, is conducted to the auricle, and thence to the ventricle by way of the auriculo-ventricular bundle (bundle of His or Gaskell's ridge). Under conditions of abnormal stimulation, contractions may originate in the auriculo-ventricular node in the wall of the right ventricle near the coronary sinus; or in the auriculo-ventricular bundle on the ventricular side of the node; or in the auricular tissue itself."—Clinical Osteopathy.

Fibers from the right vagus pass to the sinoauricular node, and from the vagus to the auriculo-ventricular bundle. Lesions of the upper three cervicals may readily disturb the vagi through circulatory and chemical sources as well as through the communicating branch of the second spinal nerve. Thus the rhythmic power of the heart, rate and strength, and conductivity of impulse may be readily influenced, which is borne out by clinical experience.

There are several forms of irregular heart action. For a description of same it is probably best to refer the student to special works.¹

The more common forms are **Sinus Irregularities**, the **Extrasystole**, **Paroxysmal Tachycardia**, **Auricular Fibrillation**, **Auricular Flutter**, and **Heart-block**. **Pulsus Alternans** is a rare form, and is of grave significance when the heart muscle is degenerated. A knowledge of **auricular fibrillation** is of special value, for it is a common form and often indicates a serious condition.

Most of the irregularities are not of special pathological importance,

1. Mackenzie, Diseases of the Heart; Lewis, Mechanism of the Heart Beat; Macleod, Physiology and Chemistry in Modern Medicine.

providing the heart muscle is healthy. They are best studied through instrumental means and require considerable experience in order to determine the exact condition.

Frequently, unnecessary worry has been the result in discovering irregularities in the young as well as in otherwise healthy adults. Only when the cardiac muscle is diseased or degenerated through various infections and toxic properties in the blood should they receive unusual attention.

Dorsal and lower cervical lesions that affect the heart by way of the sympathetics no doubt disturb nutrition of the heart tissues. And lesions of the vagi, particularly of the upper three cervicals, will disturb the rhythm, rate, strength, and conductivity of the impulse through auricles and ventricles. In no other organ of the body will the osteopath be better rewarded for careful and painstaking work than in normalizing the stimuli from sympathetic and vagi that influence the heart. Stimulatory and inhibitory efforts will frequently suffice, but in our judgment it is always better to secure interosseous adjustment if possible.

Though a number of individuals with heart irregularities are of a neurotic type, that predisposes to nervous disturbances of various kinds, still it would be an interesting study, especially in cases of children, to note what percentage are the result of upper cervical lesions caused by birth injury.

Angina Pectoris

Angina pectoris is characterized by pain in the cardiac region which usually extends to the inner side of the upper arm and forearm. "This region corresponds to the peripheral distribution of the lower cervical nerves (6th and 7th in the arm) and the upper three or four dorsal nerves (in the upper arm and the chest)."¹ Occasionally similar areas of the right side are affected, and in a few there is pain in the lower jaw and back of the ears. "The starting of the pain is usually across the chest, about the level of the third ribs, or as low as the fifth ribs," although the inception may be anywhere in the left chest or the arm. The duration of the pain is from a few seconds to several minutes; sometimes it may remain for several hours.

Osteopathic lesions are invariably found in the upper dorsal, including ribs, or lower cervical region, which are predisposing factors that tend to exhaust and weaken the cardiac muscle, and disturb the coronary circulation, so that resistance is lowered. Thus toxic agents and

1. Mackenzie, Oxford Medicine, Vol. II.

infections may readily involve the cardiac tissues. Many cases present more or less arteriosclerosis, which involves the heart and affects its circulation. Inflammation of the root of the aorta from syphilis is a frequent cause. Valvular heart disease and chronic nephritis are other underlying factors. Worry, strenuous living, and continued physical strain are to be considered. There are a group of cases, that are comparatively mild and frequently found in women, that are of toxic origin, due to intestinal stasis as a result of constipation, adhesions, etc. The ileocecal section is commonly involved in these instances. Focal infections may be an exciting cause.

The **osteopathic lesions** undoubtedly affect the cardiac innervation, particularly vasomotor and trophic, thus leading to consequent disturbances of cardiac circulation and resulting irritation to the ganglia. Sclerosis and spasm of the coronaries, ischemia, cramping, exhaustion, and degeneration of the heart muscle, and cardiac neuralgia, are various results that may take place.

The **paroxysm** usually begins suddenly, often during exertion or intense mental emotion. The pain is agonizing and of a grip-like character, and there is a feeling of impending death. The intercostal muscles are constricted and there may be a feeling of suffocation. The pains radiate up the neck and down the arm, and may be accompanied by numbness or tingling. There is usually extreme pallor, and the skin is ashen. Sweating is not uncommon, and dyspnea may be present. The attacks occur at intervals, varying from a few days to many years. After the paroxysms there is instant relief.

Other cases may present less severe attacks.

In the **diagnosis** the only condition with which true angina pectoris is liable to be confounded is pseudo-angina pectoris. **Pseudo-angina** or hysterical angina occurs chiefly in women or in neurasthenic men. These cases are often excited by toxemia. The attack usually occurs at night and is unassociated with organic heart disease. There is a feeling of cardiac **distention instead of constriction** as in true angina. There is emotional excitement and the attack lasts one or two hours, which is usually longer than that of true angina. The **prognosis** is unfavorable, although many cases live for a number of years. A few cases have recovered under a thorough course of treatment.

The **treatment** of angina pectoris consists in correcting the disordered upper dorsal vertebræ, the upper left ribs over the heart, and the lower cervicals. Invariably lesions are found in this region and if the treatment is applied to correct these disorders, the attack can frequently

be relieved. By following up the treatment during the intervals, a number of cases can be practically cured. A common lesion found is a slight lateral curvature in the upper dorsal region. This curvature is oftentimes great enough to cause a subdislocation of several of the ribs, which certainly complicates the derangement, at least as far as a quick cure is concerned.

During the attack raise the ribs over the heart at the point of constriction so as to relieve the impinged nerve fibers. Hot drinks are of value. The vagi and phrenic nerves may also be at fault in some cases. The sensory nerves to the heart are from the first, second and third dorsals.

Ice-bags or heat applied locally will be a helpful measure. In cases where there is high arterial tension, an inhibitory treatment to the upper and middle cervical regions will be of special aid, as it relieves this tension by affecting the vasomotor nerves. This treatment will at least overcome the **vasomotor form** of angina pectoris. Hot foot-baths and friction will also be found of value. In many cases under forty or forty-five syphilis is a cause. In cases past middle life there is often organic disease of the circulatory organs.

The patient should at all times avoid any excitement and live a very quiet life. He should take frequent vacations. He should take the best of care of himself and his food should be nutritious. In pseudo-angina the treatment is to relieve the irritation to the nerves affected as well as the underlying affection.

DISEASES OF THE ARTERIES

Arteriosclerosis

(ATHEROMA)

This is a thickening of the intima of the arteries, due to an inflammatory increase of the connective tissue, associated with more or less fatty degeneration and calcification.

Old age, alcohol, lead, gout, syphilis, rheumatism and other infections, laborious work, overeating, nephritis, and calcareous water tend to produce the condition. **Excessive eating and drinking** are common causes of both atheroma and chronic renal diseases and should always be regulated. Physical overwork, chronic intoxications, etc., produce hypertension of the vascular system and thus lead to changes of the vessel walls. A rigid spine is invariably found; this may be a causative factor in itself, or an associated condition. All of the above list of causes are important.

Pathologically, the arteries are thickened, tortuous and rigid. The intima may be occupied by rough, calcareous plates. In extreme cases the sub-endothelial tissue undergoes degeneration and breaks down in spots, forming "atheromatous abscesses." The disease may be **circumscribed** or **diffuse**; in the latter there is a widespread distribution of the affection. Owing to the general effect, the heart, liver and kidneys receive less blood and tend to atrophy. Microscopically, there is found more or less fatty degeneration of the different coats, and an overgrowth of connective tissue in the intima. The arteries most frequently affected are the aorta and coronary.

Symptoms.—Circulatory.—There is a high tension pulse and accentuation of the second aortic sound. There is also dyspnea, severe pain in the left side, palpitation, pallor, and the left ventricle is hypertrophied. **Cerebral.**—Such symptoms as headache, tinnitus, aphasia, vertigo, syncopal or epileptiform attacks may be present. **Renal.**—There is an increase in the quantity of urine, which is of a pale color and low specific gravity; at times it is albuminous. The disturbance leads to atrophic nephritis. There may be gastro-intestinal symptoms, as constipation, pain, etc., due to hardening of the splanchnic vessels. In some cases the peripheral arteries become obliterated. The veins become hardened.

Sequelae are cardiac dilatation, heart failure, paralysis, apoplexy, fatty heart, aneurism, contracted or senile kidney, angina pectoris, and in extreme cases, gangrene of the extremities.

Diagnosis.—The characteristic symptoms are hardened arteries, high tension of the pulse, hypertrophy of the left ventricle and accentuation of the aortic second sound. The average blood pressure is from 160 to 180 mm. of mercury, though it may be considerably higher.

Prognosis.—Many cases can be greatly benefited by osteopathic treatment, and at the incipency the improvement is generally marked. It usually runs a very chronic course.

Treatment.—The treatment must necessarily consist, principally, in the removal of such conditions as are producing the degeneration. The rigid spine should be carefully treated by methods (preferably traction) that overcome the contractures and release the intervertebral discs. The dorsal and lumbar areas, and the abdominal organs should receive special attention. Out-door life and plenty of rest are important. Alcoholism, gout, rheumatism, syphilis, etc., must be remedied before there can be much change in the arteries. Freelifing and all excitement must be stopped. The patient's cooperation is invaluable. A milk diet is often beneficial. Besides treatment of the primary disease, a general treatment will be of much avail in equalizing and reducing arterial tension. Brunton¹ speaks of cases of atheroma being cured by exercise and manual treatment to the rheumatic joints themselves. One, apparently suffering from senile dementia, was much improved after two years of this treatment applied to the joints, and showed benefit to the cerebral circulation. The bowels and kidneys should be kept active, and the general health of the patient carefully watched. Keeping the skin active by daily baths is an essential factor in the treatment. Very frequently the disease is not only retarded, but improved. In high blood pressure venesection may be of benefit.

1. Lectures on the Action of Medicine, p. 343.

DISEASES OF THE BLOOD

BY EARL R. HOSKINS

General Considerations:—It has been said that each individual is a part of all the generations which have preceded him. In the same way it might be said that every drop of our blood is a part of every other cell in our bodies. The other tissues are able to maintain their existence only through the ministrations of the blood and in turn the blood derives its own substance from tissues which it supplies. We are accustomed to speak of certain organs as being those of blood formation, yet it is true that every tissue furnishes its quota of blood composition, making up the mass which we call blood.

It is in one way an algebraic sum of good and baneful substances, without which there can be no normal function, and sometimes being of itself a menace as well as an aid to other tissues, as in sepsis. There can be no perverted function of any tissue without there being a direct effect upon the blood. We may not always be able to measure this effect with our present laboratory methods. We may not be able to detect clinically the result of this alteration of the blood stream because of compensatory influences, dilution, phagocytic action, enzymatic action, oxidation, and the intricate processes of excretion. It must also be remembered that normal blood is not of a certain definite chemical or physical composition. It must vary from minute to minute according to the normal metabolic phenomena which make up our succession of events associated with life.

But comparatively little is known about this most important fluid. We have accumulated data regarding morphology and relative numbers of its formed elements and their behavior when sufficient abnormality is present to upset their wonted balance of arrangement. We have an ever widening field of investigation in the blood plasma in which we are constantly being told of newly discovered complexities. Certainly the field of the unknown is big enough to contain our unexplained blood reactions.

It is probable that as our knowledge increases our number of diseases really considered as true blood diseases will decrease and be shown to be the effect of blood passing through certain pathologic tissues of the body. We can measure the number and proportion of formed elements, and the relative efficiency of the erythrocytes by the amount of hemoglobin which they carry. The genesis of the formed elements

is to be kept in mind in considering therapy. The erythrocytes and granular cells developing in adult life, principally from the red marrow, leads our attention in decrease or increase of these particular cells to the greatest aggregation of red bone marrow which happens to be in the ribs. The anatomical relation of the ribs to the spine would seem to render them very liable to disturbances of nutrition and nerve control as a result of structural maladjustment and clinically this presumption is verified. Limitation of the motion of the thoracic spine is perforce accompanied by costal inactivity with disuse effects upon the red marrow and eventually upon the relative content of the blood stream.

We can measure the efficiency of the erythrocytes in carrying oxygen to the tissues by measuring the relative amount of hemoglobin which a given volume of blood contains. The actual changes taking place in blood character are often thus sufficiently indicated for us in terms of our present methods of examination, to at least aid in the arrival at a diagnosis. We sometimes have to remember that the adaptation to abnormality may be efficient enough to keep the apparent significance from telling the "whole truth."

The Anemias

The class of diseases which are referred to as the Anemias are those in which there is an actual, or apparent, decrease in the oxygen carrying element or hemoglobin. This may not be due to an actual decrease in amount of hemoglobin, but rather to a decrease in the ability of the red cells to carry it. This decrease in ability may be due to alteration in the erythrocytes themselves, or to effects of change in the molecular concentration of the plasma in which they are suspended. The plasma may also contain certain poisons probably protied, which may make impossible the efficient carrying of hemoglobin by the erythrocytes.

The simplest form of anemia is that due to removal of a large percentage of erythrocytes from the body. This condition is fulfilled in acute hemorrhage. If the amount of blood lost does not exceed the amount necessary to maintain circulation, roughly fifty per cent of the total quantity, the fluid portion lost is quickly replaced from the fluids of the body and from material ingested. The formed elements and proteids are less rapidly replaced by a compensatory increase in function of the hematopoietic tissues so that there is a gradual return to the original number and proportion.

A blood cell may be considered as passing through a life cycle of infancy, adolescence, maturity, and senility before it is finally destroyed.

If the demand for new cells is not too great it will be met with mature cells. If the call is more urgent, younger and older cells will both be put into the conflict, while in a time of extreme stress all types of cells, from the "school boys" to the "gray-beards", will have to be utilized to maintain life. So, roughly, we can judge the severity of the anemic process by the reaction which the body makes to it as indicated by the character of the cells in service.

The pigment, hemoglobin, is slowly regenerated even as compared to erythrocytes, so that the color index is usually the last finding to return to normal after a hemorrhage. The leucocytes are usually increased after hemorrhage, probably as a protective mechanism, nature having learned by hard experience that she has less resistance to infection, when there is loss of a considerable quantity of blood.

To be considered, also, is the fact that constantly blood cells are out-living their usefulness—some must be disposed of. The extra function required of these older cells gives the same results as over work upon an old man—hurries his time of demise so that there is a greater percentage than usual to be sent to the salvage shops. The regeneration of blood after hemorrhage depends upon the severity of the loss, the nutrition, upon the treatment given, and indirectly the ability of resistance developed by the patient.

In the chronic anemias we may have either defective development of erythrocytes, or defective function of them, or a relatively too great destruction of these same agents.

A bank account may be depleted either by too small deposits to account for current expense, or by extravagant withdrawals. It is sometimes difficult to determine on which side the fault lies. It seems to be nature's plan not to subject to active work an erythrocyte until after the nucleus has disappeared, judged by ordinary methods of staining. A sudden call for an increased number of erythrocytes may force the organism to send in some with nuclei, but the circulation does not receive those which have not been standardized, as to shape and staining reaction, unless the crisis is of grave import. Evidence of increased destruction of these cells is shown by broken forms—shadow forms, and by an increased excretion of the pigments derived from the breaking down of hemoglobin, namely bilirubin and urobilin. A great deal of information can be obtained by a study of the other formed elements of the blood.

In general the symptomatology of all the anemias will be that of lessened metabolism because of deficient oxygenation. This is accompanied by imperfect nutrition and general impairment of function.

Among the usual results are muscular weakness, malaise, headache, dizziness, anorexia, and cutaneous and membranous pallor, with tendency to local hemorrhages. The heart is often rapid, easily disturbed in rhythm, may possess a hemic or functional murmur, and gives a soft compressible pulse of low pressure. As a compensatory attempt the respiration may be rapid, but is likely to be shallow, and dyspnea results from disproportionately small exertions.

There may be either troublesome constipation, or diarrhea; often there are alternating periods of each. In the severer forms convulsions, coma, delirium, stupor, localized edema of the ankles or eyelids may be seen.

In general the treatment of the secondary anemias will concern the removal of the cause followed by measures tending to increase the decreased element or elements in the blood stream. In the anemia resulting from hemorrhage the thirst which follows is the body's method of calling for more fluid with which to maintain pressure in the arteries and capillaries sufficient to develop new formed elements to take the place of those lost. If the loss is severe enough to give rise to shock, emergency measures are necessary of introducing into the venous stream an artificial fluid to make up for the fluid part of the blood lost. If the condition can be predicted and a suitable donor obtained, blood transfusion is of greatest advantage to the patient. More often the urgency of the condition will require an artificial fluid to be given in haste. Probably the best so far devised solution is Fischer's physiological salt solution. In the anemias due to chronic metal poisoning as from lead and mercury, or from systemic poisoning such as syphilis or malaria, or from the retention of metabolic products as in some of the diseases of the kidneys or of the liver, the anemia can only be successfully treated by normalizing its primary cause—as it occurs in the role of a symptom or result, and hence is only indirectly a blood condition.

Costogenic Anemia

(BURNS' ANEMIA)

Costogenic Anemia is a result of functional disuse-atrophy of the hematopoietic organs, there being an insufficient supply of erythrocytes to meet the demands of the metabolism of the body. It results from insufficient opportunity for nutrition and drainage of the red marrow of the ribs, and gives the clinical picture of an anemia due to too slow production of erythrocytes.

Etiology.—The condition is predisposed to by any factor which

tends to limit the action and nutrition of the ribs. We are too prone to forget that the function of the ribs is to produce erythrocytes; it is really a matter of secondary importance that they make up part of the thoracic wall. The change from the horizontal to the upright position has tended to a drooping of the whole chest from gravity. The human animal seldom develops the free hinge rib motion as often seen in quadrupeds. The passage of both arterial and venous blood, is not normally free and copious, and as a consequence the tissue supplied functions less efficiently. This function of the red marrow is to produce erythrocytes. Any structural lesion of the dorsal vertebral column, or its costal articulations, which interferes with the free motion of the rib thus interferes directly with the efficient function of these particular ribs. The severity of the condition varies with the number of ribs affected and the impedance to nutrition and drainage.

Diagnosis.—The condition may be of gradual onset, and may be associated or coincident with some other condition leading to a loss of tone or opportunity for free rib action. The systemic symptoms are due to a deficient oxygenation of all tissues as a result of the above disuse. The thorax is usually rigid—forced respiration requires unusual effort without proportionate thorax expansion. The type of breathing tends toward diaphragmatic. The quantities of tidal and supplemental air are both markedly decreased. The lack of tissue oxidation renders elimination less active, hence constipation. Gas accumulation, weakness, insomnia, with slightly increased amount of urine, and low in total solids, is the rule.

“The blood itself is rather characteristic. Coagulation time is increased; specific gravity and viscosity diminished; red cell count normal or only slightly diminished; hemoglobin 6 to 10 grams per 100 c. c. of blood (Meischer); 40% to 80% (Dare). The red cells are small, pale, vacuolated, sometimes nucleated. The white cell count is normal, slightly increased or slightly diminished. The hyaline cells are normal, or slightly relatively increased. (These, being formed in lymph nodes, tonsils, etc., are not affected by rib changes.) The mononuclear neurophiles are relatively increased. The nuclear average of the polymorphonuclear neutrophile is low. Vacuolated and atypical neutrophiles are often found. Basophiles, myelocytes and amphophiles may be found in considerable numbers. Nuclei in all granular forms present evidences of immaturity or degeneration—they may be swollen, vacuolated, extruded, ragged, or with variable staining reaction” (Clinical Osteopathy).

Treatment.—The treatment is to obtain a normal function in the inactive tissues. This is done by getting better rib hygiene. Whatever is interfering with rib function and metabolism is to be removed. Breathing exercises are given not only to “ventilate the thorax, but to exercise its walls”. Carefully selected horizontal bar work is often of great value. The diet should be of such nature as to supply material for manufacture of erythrocytes and for loading them with hemoglobin as well. Hence the foods with high chlorophyl or hemoglobin content should be emphasized.

Prognosis.—This depends on patient's desire for improvement of his condition. He can be improved by correction of whatever lesions there may be interfering with his freedom of thoracic motion. He can be benefited by manipulations which adjust the ribs, but his cooperation is essential. Lack of cooperation on the part of the patient, which would tend to increase the mobility and metabolism of the ribs, renders him more liable to any of the intercurrent pulmonary infections, as a result of his deficient thoracic ventilation.

Encourage free thoracic respiration especially when in school, or when under conditions which ordinarily would tend to slovenly habits of breathing.

Chlorosis

(GREEN SICKNESS)

An anemia characterized by great reduction in the amount of hemoglobin. It most frequently occurs in adolescent girls. It seems to be associated with neurotic manifestations and menstrual irregularities.

Etiology.—Its cause is not well understood. Poor hygienic conditions may be a factor, but it is a condition found in all stations of life. The age and sex have led to investigation as to probability of lack of an ovarian internal secretion. The reports of workers are contradictory. The name of the condition is derived from the color of the skin, which usually ranges from a pale greenish tint to a slight pallor. Occasionally there is localized vasodilation of the cheeks giving brilliant color. Constipation accompanied by copremia seems to be either a causative factor or result. In many cases it appears to act in the dual role. Fixation of the middle and lower ribs accompanied by osteopathic lesions from the mid to the lower dorsal spine seem to be constant findings. The costal fixation leads to lessened respiratory excursion and resulting diminished oxygenation.

Diagnosis.—Chlorosis may be suspected from the color of the skin, perverted appetite, wandering neuralgias, heart palpitation, edematous infiltration, and shallow type respiration, but the diagnosis is not to be made without the aid of the blood count. The striking part of the blood picture is the great reduction in amount of hemoglobin carried by each erythrocyte. There is usually some reduction in the erythrocyte percentage but not in proportion to the decrease in color index.

There are usually many pessary-shaped and shadow erythrocytes. These are of all sizes, but seldom is the condition of such gravity as to cause more than an occasional nucleated red cell, and when found are most likely to be normoblasts. The staining reaction is of wide limits. Cells of all degrees of relative alkalinity are found and often there is a wide variation of staining reaction in the same cell. The number of erythrocytes is usually slightly decreased but not in the proportion that the hemoglobin percentage is, so that the color index is therefore strikingly low. Probably, the average color index for a typical case of chlorosis is 50, with an erythrocyte count of 4,000,000 and a hemoglobin of 40 per cent (Dare.) This drop in color index in chlorosis is far out of proportion to the clinical symptoms which would be expected from a similar reduction resulting from the ordinary causes of secondary anemia. The blood plasma is increased and the specific gravity is lowered, sometimes reduced from 1.055 to about 1.030.

Treatment.—The treatment of any malady in which the etiology may be apparently of widely different natures will naturally rationally vary with the apparent cause. If there is copremia, which seems to be a definite causative factor, this should be at once corrected. These patients form the cathartic habit readily, so physical and dietary methods of returning the digestive motility to normal should logically be given first trial. If it is a matter of lessened metabolism as a result of insufficient exercise, or blood oxygenation, out-door gymnastics and breathing exercises may incite the stimulus to normal erythrocyte hemoglobinization. The diet should be of such nature as to furnish material both for erythrocyte formation and iron in form for ready absorption by them. The organic iron compounds of animal hemoglobin and vegetable chlorophyll are our most common and cheapest as well as most effective sources.

The medical treatment of chlorosis is based on the empiric use of inorganic iron. "The exact method in which iron exerts a favorable influence upon chlorosis still remains unsettled. It is difficult to understand why iron salts in the food which are sufficient for all ordinary needs, are insufficient in chlorosis. It seems most probable that iron cures

chlorosis by acting as a stimulant to the **blood forming organs**" (Beifeld, *The Basis of Symptoms*.)

Clinically, osteopaths are daily obtaining rationally the necessary stimulus to the blood forming organs by removing all impedance from these organs caused by vertebral and costal lesions and by obtaining better digestive and respiratory hygiene.

Prognosis.—Recovery is to be expected and its rate will depend upon the thoroughness of the osteopathic work and the patient's ability to respond to the stimulus. The blood may show chlorotic relapses with concomitant symptoms if in later life secondary anemia develops from hemorrhage, hookworm infection, or other causes.

Pernicious Anemia

This anemia is of obscure etiology, characterized by progressive destructive hemolysis of the erythrocytes, usually with fatal termination. The cells retain their hemoglobin carrying ability, so that while the hemoglobin is decreased in percentage, the proportionately greater decrease in the number of erythrocytes leads to a marked increase in the color index. The destructive influence upon the red cells may be sufficient to allow only a small percentage of the erythrocytes to appear normal and show the greater number to be deformed, or in various stages of degeneration. Cells which in times of health would have been sent to the "salvage station" are retained to carry an over-load for them of hemoglobin to the needy tissues. Immature nucleated cells of all types are drawn into the battle long before they can be efficient carriers to help supply oxygen to the tissues. Seldom will a secondary anemia be severe enough to produce megaloblasts in the blood stream yet they are a rather constant finding in pernicious anemia. With these cells of irregular carrying capacity and development, anisocytosis and polychromatophilia are expected findings.

Symptoms.—The condition must be regarded as a symptom complex or a result of pathologic process or processes. A type of anemia very similar in symptoms and blood findings to the pernicious anemia is produced by the toxins of advanced malignancy, and by at least two forms of intestinal parasites, the *ankylostoma duodenale* and the *bothriocephalus latus*. In the true pernicious anemia we have similar results but are not able to locate the primary pathology. There are present synchronously, enormously increased destruction of erythrocytes and enormously increased production of them but we are unable to determine which is primarily at fault. The belief that the cells are more fragile

and too easily broken up has led to the removal of the erythrocyte destroying spleen in the hope that destruction would be delayed until regeneration of even imperfect cells would balance the need. Occasionally, the algebraic sum of regeneration and destruction may be apparently balanced and not tell the tremendous amount of pathology both productive and destructive, that the body is going through.

The first symptoms are of easily produced fatigue of all the body, brain, muscles, diminished digestive secretion, and dyspnea. As a result of poor tissue oxygenation, fatty degeneration takes place in the more active organs as the heart, kidneys and liver. There may be extensive degeneration of varying areas of the central nervous system. Some of these areas are due to hemorrhages from the general tendency to breaking down of vessel walls. Often these areas of destruction affect the posterior horns of the spinal cord, and, occasionally, a blood count differentiates between similar symptoms of pernicious anemia and tabes dorsalis. There is seldom any emaciation; usually the patient appears "puffy" with a "pasty" color. There is variable sub-cutaneous edema. The symptoms being of such wide distribution and character, the patient is usually treated for all sorts of supposed conditions until some one makes a blood count at a time when there is enough disturbance of equilibrium to give the findings of pernicious anemia.

Treatment.—The treatment of the form due to intestinal parasites gives striking results on removal of the causative organisms. Some advise treating all cases having these blood findings on the assumption that the presence of these parasites is responsible for the condition. The treatment of the idiopathic form resolves itself into building up the ability of the body to resist disease and the removing of all possible agents for depressing the vitality of the body. Rest in bed coupled with the digestible and assimilable limit of nutrition often gives temporary improvement. Removal of questionable teeth also often aids for a time. Correction of troublesome osteopathic lesions is often accompanied by the same result. The symptomatic osteopathic treatment always makes the patient more comfortable, often gives temporary improvement, and, occasionally, has given a return to normal that has persisted for several years.

Prognosis.—It is nearly always possible to obtain transient improvement, but the pernicious anemia patient is usually dead within two years from the time the diagnosis is well established.

The Leucemias

As a result of any inflammatory process, there is a physiological reaction or stimulus leading to an increase in the number of neutrophilic leucocytes found in the peripheral circulation. As long as this increase does not crowd out other cells, red and white, sufficiently to interfere with their ability to function there is nothing but gain to the body of the character of more efficient bacterial destruction. After the need for these cells has passed, their number is decreased by destruction and the lessening of their production, until an equilibrium is reached which will be maintained.

This same process of making and destroying is constantly going on for all of the different classes of cells found in the blood stream. Over-production of any type will lead to actual increase of that sort of cell in circulation, and, if unaccompanied by over-production of other types, will lead to a relative decrease of the other elements.

It is very difficult for the body to furnish normal cells very much in excess, relatively, of the normal number, so that when the stimulus leading to immense over-production is at work immature cells in great numbers are apt to be thrown into the blood stream. As an example, the case of leucocytosis which has a white count of 60,000 is extreme and the patient nearing death, yet it may not show many, if any, abnormal types of cells. A case of myelogenous leucemia with a white count of 60,000 would not be proportionately sick, and would be a mild case—yet the greater part of his white blood content would be made up of cells not found in normal blood. The leucocytosis patient is suffering more from the **cause** of his increase in number of cells, while usually the leucemia patient suffers because **of** the increase of cells. In one, the cause is usually extrinsic, and, in the other, it is intrinsic as far as the blood is concerned.

In general, then, the symptoms of a leucemia parallel in intensity the increase in cells. It takes energy to make these cells—other tissues are made to suffer from lack of this energy. Erythrocytes and white cells cannot occupy the same space at the same time. The increase in white therefore crowds the red cells out of function. Disease in relative and absolute content of erythrocytes decreases the oxygen carrying capacity of the blood stream. Hence, metabolism of the whole body suffers. Often, then, the whole apparent symptomatology of a severe leucemia is that of a secondary anemia.

The primary pathology is of hyperplasia of the particular genetic tissue of the type of cells which are in excess, and is proportionate in amount to the excess developed.

Splenomedullary Leucemia

(MYELOID LEUCEMIA; MYELEMIA)

Myelemia is a disease characterized by an enormous increase in the white cell content with proportionate changes in the spleen, liver, and the blood marrow.

Etiology.—It is a disease occurring at all ages, but the majority of cases are recognized in adult males.

Heredity, trauma to the spleen, malaria, syphilis, and rapid repetition of pregnancies seem to be at least exciting factors. A few cases have been reported in which tenth, eleventh, and twelfth rib lesions were definite etiologic factors by pressure.

Diagnosis.—The patient goes through a period of vague, indefinite, and wandering symptoms. General malaise, weakness often accompanied by dyspnea, and emaciation similar in many ways to incipient pulmonary tuberculosis, except that the slight temperature changes are not typical. At the same time there may be digestive discomfort of various kinds without typical pathology. Of these early symptoms the most persistent is the **dyspnea** which is a structural result of the increase in size of the spleen. As a direct pressure result of this hyperplasia, there may develop dropsical infiltration of the lower extremities and ascitic accumulation in the abdominal cavity.

With the changes in the blood itself, the blood vessel walls break down more easily, and subcutaneous hemorrhages, epistaxis and hematemeses are common.

In an attempt to destroy the excessive amount of white cells, the liver may become enlarged. But this occurs later and of much less degree than the enormous increase in size of spleen. There may be areas of hemorrhage with resulting softening in the spinal cord. The most likely areas to suffer are the posterior and lateral horns, with resulting paraplegia, spastic or ataxic.

Usually, the course is slow, and the condition is truly chronic. But, occasionally, the rapid increase and succession of symptoms, with concomitant blood changes, change the diagnosis to acute myelogenous leukemia.

The total cell count, red plus white, is diminished, for while there is enormous relative increase of the white cells a greater actual decrease takes place in the reds. This decrease in reds is partially relative from crowding out of erythrocytes by leucocytes, but there is also actual de-

crease in their formation, so that there is an actual anemia present as well as a leukemia.

In some respects the red cells behave as in chlorosis, each carrying a diminished percentage of hemoglobin, resulting in a low color index. Atypical staining reactions and morphology, together with many fractured forms, are the rule. Normoblasts are common throughout the course of the disease, but megaloblasts seldom appear until near fatal termination.

The changes in the white cells are enormous, both as to numbers and character of cells found. The total white count often exceeds 350,000. This, with the accompanying reduction in number of erythrocytes, leads to a reduction of the ratio between reds and whites to as low as 1 to 5 or 3, or occasionally 1 to 1. There is an actual increase in number of all the white cells with the possible exception of the lymphocytes. In the actual increase of polymorphonuclear neutrophils and eosinophils is rendered a sharp relative decrease by the enormous production of myelocytes. Basophils are usually both relatively and absolutely increased. In a white count of 350,000 it is not unusual to have present 325,000 myelocytes, with 25,000 as the actual number of ordinary leucocytes. There is, therefore, a **mild leucocytosis** coupled with a **violent** leukemia. These two are combined with an **anemia** that varies with the course of the disease.

Treatment.—The treatment is largely hygienic, including thorough osteopathic attention to the lower dorsal and costal area. Symptomatic treatment is often followed by temporary improvement both clinically and in the blood picture, but complete recovery seldom takes place. Occasionally, roentgen therapy has given a "cure" lasting several years.

Prognosis is not good. These patients are frequently carried away quickly by some oftentimes slight intercurrent infection. Even if carefully guarded from such, the course of the process usually leads to death from exhaustion in two or three years.

Lymphatic Leucemia

Clinically, this is a parallel condition to myelogenous leukemia, except that the hyperplasia of cells occurs in lymphoid tissue, and leads to an enormous over-production of lymphocytes rather than myelocytes. It is more readily divided into acute and chronic forms than myelogenous leukemia from differences in symptomatology.

In the **acute form**, adolescents are usually affected, the condition beginning with tumefaction of the lymph glands, first noted in the cervical

region, but usually a general involvement. Dyspnea results from pressure upon trachea and bronchi by the enlarged glands of the mediastinum. There is pyrexia of 103 to 105 degrees, intermittent in character.

The pressure upon nerve trunks and plexuses in the thorax leads to variable anginas distributed not only in regions actually imposed upon but over all sorts of possible reflex paths. The blood vessels of the skin are easily broken down so that slight injuries result in great suggillation. The patient rapidly develops anemia, and later goes into a syndrome similar to the cachexia of malignancy. In fact, the rapid termination and clinical course of acute lymphatic leukemia is parallel to the action of malignancy. Probably the condition will eventually be properly classified as a neoplasm of the blood itself.

The **chronic form** occurs in later life, and, instead of being an abrupt rapid process, is slow, progressive and painless. It has the lymph gland hyperplasia, but the enlargement is so gradual that compensation is established to a remarkable degree. It is usually a generalized process, first noted in the cervical and axillary glands because of their accessibility. Usually both the spleen and liver are enlarged, but this also is a slow and later development.

There may be exacerbations of temperature, but they are not constant or usually severe. Hemorrhages into the skin are not common, but pruritus may be very troublesome.

The patient comes to a physician because of symptoms resulting from his secondary anemia, dyspnea, dyspepsia, and palpitation.

The **diagnosis** cannot be made without the aid of a blood study. The blood picture shows a severe anemia with both the number of erythrocytes and the hemoglobin percentage very much lowered. Of the two findings, the hemoglobin percentage is relatively more decreased, so that the color index is markedly lowered.

In the acute form nucleated reds are common. Just before death these may show various forms and sizes as well as the normoblasts. In the chronic form normoblasts do not appear except as the case grows decidedly worse. As compared to myelogenous leukemia the anemia of lymphatic leukemia is of greater severity.

In the leucocyte count there is great increase in numbers, the greater part being composed of the lymphocytes. The lymphocytes may be either of the large or small variety, and occasionally are found in about equal proportions. In contra-distinction to the myelogenous type, the increased type of cells are of the mononuclear nongranular types. It is not very unusual to find a well advanced case of lymphatic leukemia

without abnormal cells in the blood count, the expression of pathology being in the shape of disturbance in number and proportion of cells rather than in development of abnormal types. The actual number of leucocytes does not go as high in proportion to the gravity of the condition in lymphatic leukemia as it does in the myelogenous. In other words, a patient with lymphoid leucemia showing a count of 90,000 leucocytes with 90% of these lymphocytes is a much sicker man than the myelogenous case showing a 350,000 leucocyte count.

Usually there is an actual as well as relative decrease of all the granular types of leucocytes with the polymorphonuclear neutrophiles especially decreased.

The **treatment** is systemic and symptomatic. Recovery is not to be expected, but these unfortunates can be made relatively comfortable and given occasional respite by judicious osteopathic care.

Hodgkin's Disease

(LYMPHADENOMA; PSEUDO-LEUCEMIA)

In a general way, the several conditions which are clinically leucemia, yet do not possess leukemic blood, can be classified as pseudo-leukemias. We do not definitely know the cause of leucemia as yet and can but little more than speculate on the various etiologic factors of the pseudo-leucemias.

Syphilis, malaria, tuberculosis, and malignancy are all considered as factors, and probably certain cases can be definitely associated with these conditions.

All of this group of pseudo-leucemias are characterized by early swelling of cervical lymph glands, followed by general gland enlargement, and by great destruction of the erythrocytes. There may be metastatic-like growths of lymphoid tissue in other organs. The enlargement of cervical glands usually begins on one side near the angle of the jaw, and most commonly in young male adults. These glands progressively increase in size, first are soft, then later become hard through fibrous proliferation. Each gland tends to increase in size by itself, not to coalesce with its neighbors, so that each separate gland can be palpated. This is more readily done as there is little tendency to fibrous adhesion formation to the overlying skin. These glands are painless throughout the course of the disease, and tend neither to caseate nor to suppurate.

The excised glands show a combined hyperplasia and connective tissue proliferation. In the soft stage of the tumefaction, the lymphoid

hyperplasia is in preponderance, while, at the stage of hardening, the fibrous tissue derived from the trabeculae and capsule of the gland is in prominence. There is increase in the size of the spleen, and occasionally of the liver, but these are never as marked as those resulting from leucemia.

The **symptoms** are, first, those due to the glandular enlargement in the order of: dyspnea, hydrothorax, dysphagia, ascites, swelling of the extremities, and jaundice.

The destruction of red cells gives a resulting anemia which goes with and exaggerates the pressure symptoms.

A process of this kind to induce such grave changes over as well protected organs as make up the lymph system, must be virulent enough to set up other symptoms, to be associated with those due to pressure or to anemia. These are usually emaciation (giving greater prominence to glandular tumefaction), cachexia, and the implantation of masses of lymphatic tissue in organs where normally only traces of this tissue exist.

Fever is dependent upon the disturbed thermic metabolism and may be practically absent or subject to wide variations.

The erythrocyte count shows a progressive decrease with a greater proportion of broken down cells and abnormal types as the condition advances. The actual count is usually between 2,000,000 and 3,500,000 per cubic millimeter. The hemoglobin usually reduces in proportion to the erythrocytes, so that there is little change in color index.

The leucocytes are not markedly changed in number (seldom over 10,000), and this is often the **diagnostic** finding between leukemia and the pseudo-leukemias. Hodgkin's disease usually has a high percentage of lymphocytes, so that there is an actual as well as relative decrease of the granular leucocytes.

The **treatment** is unsatisfactory, and is in the main symptomatic. Roentgen therapy has given temporary improvement, in some cases lasting several years. In general the **prognosis** is hopeless, the end occurring within four years of the time the condition is recognized.

DISEASES OF THE THYROID GLAND

Congestion

Physiological congestions of the thyroid gland are not uncommon during puberty, painful menstruations, pregnancy, and the menopause. The **premenstrual** congestion may persist after the menstrual function has been established, but this is comparatively rare. When the enlargement remains there is more or less hypertrophy, and it should receive appropriate treatment. Upper dorsal and cervical lesions are common. The congestion during **pregnancy** occurs in the majority of cases and seems to be a physiological process, wherein there is more or less hypertrophy and hyperplasia, which probably counteracts the waste products especially caused by this state, or due to the inactivity of the ovary. During **delivery** the gland may rapidly enlarge and remain so for an indefinite time. It seems probable that the straining due to labor may cause lesions of the upper dorsal and neck that will derange the function of the organ. When the enlargement occurs during the **menopause** special care should be taken that the goiter is not malignant.

Other possible causes of congestion are overfatigue, particularly when associated with heavy lifting; tight clothing about the neck; overuse of the voice; and in a few cases it may be discovered in boys at puberty.

The **symptoms** are congestion, the gland being very vascular, either soft or tense, somewhat painful owing to the tension of the capsule, and in persistent cases there may be hypertrophy and hyperplasia. The treatment is the same as given under simple goiter.

Inflammation of the Thyroid

Inflammation of the thyroid is not of frequent occurrence. In the several cases that the authors have seen there was some previous enlargement of the organ, which probably caused a **lowered resistance** of the local tissues. There is almost invariably some infection elsewhere in the body. The exciting causes are usually streptococcus, staphylococcus, or bacillus coli. The inflammation may follow pneumonia, tonsillitis, rheumatism, typhoid, puerpal infections, enteritis, diphtheria, influenza, mumps, etc. Trauma, carrying weights on the head, and cold, may be etiological factors.

Commonly, one lobe is involved, though the entire gland may be affected. There is swelling, the capsule is distended and painful, and small hemorrhages occur which in the case of suppuration form the site of

the abscess. The swelling involves the parenchyma and interstitial tissue.

The **onset** is usually sudden with chills, fever, and pain over the glands. The patient keeps the head flexed to release the muscular tension, swallowing is painful, and there is a sense of constriction. A rapid heart may be a prominent symptom. Much depends at this period on the **treatment** given. If the drainage can be freed, by lowering the first ribs and raising the clavicles with attention to the dorsal and cervical innervation, prompt subsidence of the condition commonly takes place. This should be carefully accomplished in order not to bruise the parts.

Diagnosis is not difficult as a rule. The symptoms and history of infection will generally suffice. Hemorrhage may occur in a goiter and somewhat simulate inflammation. A possibility of **malignancy** is to be considered.

If the condition does not yield to treatment, surgical interference may be necessary.

Tuberculosis and **syphilis** of the thyroid are rare conditions. **Woody thyroiditis** may be mistaken for malignancy. The gland is very fibrous, and when cut has a dry surface. The connective tissue is hardened and crowds upon the parenchyma. This condition is usually found in young men. It develops rapidly, with more or less pain and dyspnea. **Adenocarcinoma**, **carcinoma**, and **sarcoma** are rare diseases¹, still one should be on his guard as to their possibility. They are most apt to occur after forty. A rapid enlargement should be regarded with suspicion.

Simple Goiter

We employ the term simple goiter to designate chronic enlargement of the thyroid gland not due to inflammation, exophthalmic goiter, or malignancy, although the latter conditions are frequently associated with or follow the former. There is usually an enlargement of the gland in cretinism, and occasionally in myxedema, but the functional grade of the gland is far different from that in other diseases of the thyroid.

The disease is very prevalent in certain regions of Europe and Asia, although in the United States it is not so common, except in the environs of the Great Lakes, the District of Columbia, and the Northwest states. The second decade of life, probably owing to adolescent changes, especially in girls, develop the greater number of goiters. It is infrequently congenital, and occasionally a case will develop as early as four or five years of age.

1. Ewing, Neoplastic Diseases; Grotti, Thyroid and Thymus.

Etiology.—Disturbed innervation of the gland unquestionably seems to be the predisposing cause of the deranged secretion and vascular changes, which if continued finally lead to hypertrophy and hyperplasia of the tissues. These lesions are found from the fifth dorsal to the occiput and to the corresponding ribs. They probably involve secretory fibers of the sympathetic that emerge from the upper dorsals, first to fifth inclusive, maximum effect second, third and fourth. "Evidence is presented that the impulses pass to outlying neurones whose cell bodies are located close below the superior cervical ganglion and also in the inferior cervical ganglion."¹ In both these ganglia impulses to the thyroid pass from preganglionic fibers to the outlying neurones. This also includes the area of vasomotor² innervation of the head and neck.

In a number of cases cervical lesions alone will disturb the thyroid innervation, especially from the second to fourth segments. These may involve the superior cervical sympathetic, owing to its relationship to the rectus capitis anticus major muscle. Then there are afferent association fibers that pass down through the lateral horns and whose connecting fibers emerge via the upper dorsal.

The lymphatic drainage of the thyroid should not be neglected. Lesions of the upper ribs and clavicles are very prone to impede its circulation, and thus predispose to secondary infections.

Infection from septic foci are important secondary factors. This is particularly true of focal infections of the upper respiratory tract and buccal cavity, although infections and toxins from various regions may be exciting factors. Toxemia due to intestinal stasis is not rarely an important consideration.

McCarrison insists that infection from certain waters is the cause of goiter. He finds that boiling the water renders it harmless.

Pathologically, the first effect upon the gland is to lessen its iodine content. The circulation is increased, with hyperplasia of the epithelial tissue, and a lessened amount of colloid material. If the condition continues, the alveoli will again become distended with the colloid material so that the epithelial tissue cells are almost flattened. This represents the so-termed **colloid goiter**. The gland, commonly the whole organ, though one side may be involved, is fairly uniform in size. In rare instances, the gland may surround the trachea—the so-termed circular goiter. Hemorrhages may occur, and there may be various alterations

1. Cannon and Cattell, The Secretory innervation of the Thyroid Gland, Am. Journal of Physiology, July, 1916.

2. Gaskell, Involuntary Nervous System.

and degenerations. When the vessels are much dilated, it is often called a vascular goiter, though the colloid changes are present.

The **nodular goiter** is another form characterized by new formation of gland tissue that is not diffuse but circumscribed. These cases are apt to follow persistent involvement of the gland at puberty. The two forms may occur together, and there may be various combinations and changes. In the nodular goiter there is comparatively little colloid. There are many blood-vessels, and small hemorrhages are frequent. This latter point should be remembered by those who treat over the gland, which at best is a doubtful procedure. Various changes may take place, as local points of **necrosis**, **cystic** formation, and **calcification**, are not uncommon.

Symptoms.—The essential feature in goiter is distension of the alveoli and formation of new ones, associated with dilated vessels, and usually degeneration of the colloid. Often the function of the gland is not noticeably disturbed. Usually, it is for the pressure symptoms or the unsightliness, due to the distension, that the patient seeks relief. Pressure upon the windpipe, gullet, or blood-vessels is not rare, and may cause more or less difficulty in breathing or swallowing. Coughing and huskiness may be troublesome. The recurrent nerves and vagus may be compressed. Disturbance of the heart, such as palpitation, tachycardia, and hypertrophy may be caused by the effect of pressure upon the blood-vessels, or to changes in the secretory function of the gland.

Treatment.—Adjustment of the upper dorsal and cervical lesions will be followed by recovery in the majority of cases. Dr. Still emphasized the point that the vertebral ends of the first ribs are frequently displaced upward and outward. This lesion is often found in cases following confinement. The effect of the change here is probably to the stellate ganglion, or to the lymphatic drainage of the gland. Treatment over the gland should be cautiously given, if at all. Definite correction of the lesioned vertebrae and ribs will be sufficient, but muscular manipulation and halfway measures are practically useless.

Lesions of the lower spine may be the primary source of a compensatory lesion of the upper dorsal, or they may derange the pelvic organs, or be the predisposing factor of intestinal stasis. Attention to possible focal infections, and thorough elimination, are to be considered. In goitrous regions boiling the water is of value. In obstinate cases the X-ray may be of service, and as a final resort surgery may be employed.

"Marine observed that the amount of iodine is inversely proportional to the degree of hyperplasia of the gland, and when the hyperplastic condition becomes fully developed, scarcely a trace of iodine is contained

in the gland. Later, when the hyperplasia gives place to colloid goiter, the iodine increases again, both absolutely and relatively. Moreover, it has been found that if iodine be administered to an animal suffering from hyperplasia, the hyperplastic condition very quickly disappears and the animal becomes normal."¹ His viewpoint of the hyperplasia is that an effort is being made to compensate for an "insufficiency due to inability to absorb or assimilate sufficient iodine", and thus the effect of the administered iodine is to normalize the gland by stimulation.

No one can question that this may be effective under certain conditions, particularly where there is deficient iodide in the water, but it is an essential element of the body. But it does not necessarily follow that because in thyroid disturbance the relationship between thyroid functioning and the substance containing iodine is upset that recovery depends upon furnishing more iodine to the body economy. It may be somewhat parallel to giving iron in anemia, when often the real difficulty is one of assimilation, and not insufficient iron in the alimentary canal. Moreover, case after case of goiter has recovered through osteopathic measures following a most thorough trial of the iodine treatment. It is very obvious that the cause of the goiter rested elsewhere. Dogs are susceptible to thyroid enlargement. Lesioning of the cervical region has resulted in goiter formation, and recovery has followed adjustment of the lesion. And dogs having goiter without experimental lesions have frequently been normalized by adjusting an abnormal cervical spine.

Exophthalmic Goiter

In exophthalmic goiter there is an excess of the thyroid secretion or thyroid autacoid which passes into the circulation, due to hypertrophy or hyperplasia of the secreting cells. The disease is characterized clinically by nervousness and irritability, rapid pulse, flushed and moist skin, tremor, and increased nitrogenous metabolism. A goiter is usually present, but not always noticeable. There is apt to be protrusion of the eyes, especially after the disorder is established, though it may never appear. A disturbed coordination of the muscles of the eyelid, eyeball, and orbit are frequent characteristic symptoms.

Etiology.—The essential factor in the cause of this disease is probably osteopathic lesions that irritate the secretory fibers of the thyroid tissue. These lesions are almost invariably found in the upper dorsal, first to fifth, and most often localized at the second-third or third-fourth segments. They are definite interosseous changes, combined rotation and lateral flexion, and are generally very sensitive upon palpation. The

1. Macleod, *Physiology and Biochemistry*, in *Modern Medicine*.